

PRELIMINARY

FRESNO RIVER WATER RIGHTS

July 1980



MURRAY, BURNS & KIENLEN
A Corporation

Consulting Civil Engineers

600 Forum Building

1107 Ninth Street

Sacramento, California

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INTRODUCTION

Introduction

This study divides daily historical flows recorded at Daulton gage (treated as the site of Hidden Dam) between natural flows and imported flows during the 12-year period October 1, 1961-September 30, 1972. Imported flows are those originating in the Merced and San Joaquin River systems near Fish Camp and Soquel Camp Ground, respectively. A total of 4,380 daily flows varying from zero to 7,250 cfs were analyzed.

Because Madera Irrigation District has an adjudicated ancient right to the first 200 cfs of combined natural flow and imported water available at Franchi Dam, the entire reach of river in effect was broken into two parts: (1) upstream of Franchi Dam and (2) downstream of Franchi Dam. The upstream part was divided into three reaches: (1) Daulton-Madera Canal, (2) Madera Canal-Head of Island, and (3) Head of Island-Franchi Dam. The downstream part was divided into two reaches: (1) Franchi Dam-Road 16 and (2) Road 16-Triangle T Ranch.

Boundaries of originally-riparian tracts were taken from patent data in records of the Bureau of Land Management office in Sacramento. Boundaries of present ownerships were taken from Madera County records. The portion of each originally-riparian patent now in an ownership containing a bank of the river was considered riparian. The portion of each originally-riparian patent now in an ownership which does not contain a bank of the river was considered to have lost its riparian status. In general, no title search was made nor were deeds researched to prove or disprove severance of the riparian right except that title searches previously made for Triangle T Ranch were used. Originally-riparian patents, present ownerships, present riparian land and all known historical channels of Fresno River were plotted on U.S.G.S. 1:24,000 quadrangle maps.

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Crops grown on presently-riparian land were determined from field surveys and riparian demand was based on those crops using Department of Water Resources published monthly water requirements for those crops. Demand on native pasture was considered to be the estimated diversion capability in cfs but not to exceed a volume of 3/4 acre-foot per acre in any 30-day period.

For the area above Franchi Dam, the 26 cfs in channel losses were proportioned between daily natural flow and imported water reach by reach and remaining natural flow was apportioned to meet the total riparian demand on a reach basis. No effort was made to apportion natural flow to each individual riparian.

Remaining natural flow and all imported flow reaching Franchi Dam, up to the limit of M.I.D.'s adjudicated right, was assumed diverted by M.I.D. into its M.C. and I. system at Franchi Dam. The adjudicated right limit was adjusted downward to reflect M.I.D.'s voluntary relinquishment of its Soquel water under an assumed continuation of its current contract with Pacific Gas and Electric Company.

In general, flow passing Franchi Dam was allocated first to meeting 29 cfs in channel losses between Franchi Dam and Triangle T Ranch and the remainder was apportioned to riparian crop land and native pasture in the area downstream of Franchi Dam. Apportionments to M.I.D. riparian crop land serviceable from the M.C. and I. system, other riparian crop land and Sallaberry's riparian native pasture in the Franchi Dam-Road 16 reach were identified separately. Separate apportionments also were identified for Triangle T's riparian crop land and native pasture.

Appropriative rights of Triangle T, Sallaberry and M.I.D., in that order of priority, were assumed satisfied with any water remaining after meeting total riparian demand. Where permitted places of use under appropriative rights overlapped riparian areas, the appropriative demand was eliminated.

Triangle T's maximum diversion rates were taken as 60 cfs under current channel conditions below the State-constructed outlet at Road 9 and as 100 cfs if the design capacity of the outlet is restored.

There being questions as to the exact acreages of riparian land on the Sallaberry and Triangle T ranches, maximum and minimum riparian areas and corresponding non-overlapping appropriative places of use were determined.

Only riparian and appropriative crop and pasture land now irrigated from the river and having facilities capable of, or readily repairable to be capable of, such irrigation were considered to be using water. It is anticipated that if owners of presently-unirrigated riparian land become capable of diverting from the river new analyses will be made and available flows will be re-apportioned.

Apportionment of the 4,380 daily flows was done by computer. Five runs were made as follows:

1. (a) Sallaberry maximum riparian (2,896 A) and corresponding appropriative (480 A).
(b) Triangle T maximum riparian (2,783 A including 1,399 A native pasture, 1,281 A of other crops, and 103 A of non-irrigable channels).
(c) Road 9 outlet capacity 60 cfs.
2. (a) Sallaberry minimum riparian (1,830 A) and corresponding appropriative (1,301 A).
(b) Triangle T minimum riparian area (2,121 A, including 840 A native pasture, 1,183 A of other crops and 98 A of non-irrigable channels).
(c) Road 9 outlet capacity 60 cfs.

3. 1(a) and 2(b) w/ 60 cfs Road 9 outlet capacity.
4. 1(b) and 2(a) w/ 60 cfs Road 9 outlet capacity.
5. 1(a) and 1(b) w/ 100 cfs Road 9 outlet capacity.

I. STREAM FLOW RECORDS

I. Stream flow records

October 1, 1960, was selected as the beginning of the period of analysis primarily because consistent and continuous records of Soquel diversions from the San Joaquin watershed to Fresno River are not available prior to that date. The September 30, 1972, end of the period was selected for convenience, because the period covers a wide spectrum of flows including two very dry and two very wet years, and because average flows in the resulting 12-year period of analysis are 97% of the long-term natural flow of San Joaquin River at Friant.

Soquel diversion

Soquel imports are important because Madera I.D. has an adjudicated right to divert to Fresno River up to 50 cfs of the flow of North Fork Willow Creek, if available, at the Soquel Meadows diversion dam near Sugar Pine. (See U.S.G.S. quadrangle). The diversion season is October 1-July 31. Except for 1 cfs available under the M.I.D.-P.G. and E. contract, M.I.D. does not have the right to divert any water at this point during the months of August and September.

Soquel diversion records are available as follows:

Nov. 4, 1960-Apr. 7, 1961, and Sept. 1, 1961-Sept. 30, 1972. Daily diversions during the periods of missing records were estimated from recorded flows at Daulton and at the Big Creek diversion. Oct. 1-28, 1960 flows were taken as zero as was the case June 20-August 31, 1961.

Soquel diversion records have been kept by M.I.D. and, after October 1, 1969, are published by U.S.G.S.

Currently, and in accordance with a 1977 contract between M.I.D. and P.G. and E., all M.I.D.'s Soquel entitlement except 1 cfs bypasses the diversion, flows to Bass Lake, and there is used for power production on the Willow Creek system before being returned to M.I.D. at Millerton Lake. The contract also permits M.I.D. to divert 1 cfs for fish in August and September. Under certain conditions the contract permits M.I.D. to divert its full entitlement, however, those conditions are not pertinent to this water right study and accordingly are not assumed to occur.

The M.I.D.-P.G. and E. contract is subject to renewal in 1981 and is assumed in this study to be renewed on the same physical terms.

There are no records between the Soquel diversion site and Daulton which enable firm estimates to be made of accretions or losses between the two points. Comparison of Soquel diversions and recorded flows at Daulton indicates that in general the first 4 cfs of diverted water is lost to seepage and phreatophytes en route. Accordingly, in this study, where Soquel imports are involved, the recorded diversion is reduced by 4 cfs to determine the estimated import quantity at Daulton. A time-of-travel of one day is assumed.

Big Creek diversion

M.I.D. also has an adjudicated right to divert Merced River water into the Fresno River watershed near Fish Camp (see U.S.G.S. quadrangle). The right entitles M.I.D. to divert up to the following amounts if available:

Oct. 1-Mar. 31	50 cfs
Apr. 1-30	20 cfs
May 1-July 15	50 cfs
July 16-Sept. 30	0

Diversion records are available Oct. 1, 1960-Nov. 21, 1961, and December 5, 1961-September 30, 1972. Based on immediate-prior and -after flows, the missing dates are estimated to have diversions as follows:

Nov. 22-25, 1961	5 cfs
Nov. 26-30, 1961	4 cfs
Dec. 1-4, 1961	3 cfs

Records are published by, or are on file with, the Department of Water Resources.

It is estimated that the first 4 cfs of Big Creek diversion is lost due to seepage and phreaphytes between the diversion point and Daulton and this study so assumes.

Daulton

Flows of Fresno River at Daulton, which include Big Creek and Soquel diversions reaching that point, have been published by U.S.G.S. for the whole 12-year period of analysis.

North Fork Willow Creek near Sugar Pine

This U.S.G.S. station is located about 2 miles downstream of the Soquel diversion point. The station is significant in that, in the M.I.D.-P.G. and E. contract, it is used in measuring the amount of M.I.D. Soquel water entering Bass Lake. The contract provides that M.I.D.'s Soquel entitlement is 80% of the natural flow occurring at the North Fork gage, i.e., 80% of the North Fork measurement plus the Soquel diversion, but not to exceed 50 cfs.

The record extends from August 7, 1965-September 30, 1972. There being no record at all Oct. 1, 1961-Aug. 6, 1965, this study assumes, for purposes of analyzing future effects of the P.G. and E. contract, that M.I.D.'s Soquel entitlements during the missing period were exactly equal to the amounts diverted but not to exceed 50 cfs and to equal 1 cfs in August and September.

Sample copies

Sample copies of the Soquel, Big Creek, Daulton and North Fork records for the 1965-66 water year are attached. Copies of other records used in the study are available in offices of M.I.D. or Murray, Burns and Kienlen or are in U.S.G.S. or D.W.R. publications or other records.

OKLAHOMA CITY NEAR COUGAR LINE C. 1968

WEEKLY STATION - EST.

WEEK	LILY	MIL	MIL	SEPT	OCT	OCT	NOV	NOV	DEC	DEC	DEC
G/H	Q	G/H	Q	G/H	Q	G/H	Q	G/H	Q	G/H	Q
1	.70	5.60	.52	1.80	.51	1.80	.43	1.08	.43	1.08	.54
2	.70	5.60	.51	1.80	.50	1.50	.43	1.08	.43	1.08	.54
3	.70	5.60	.51	1.80	.50	1.50	.42	1.02	.43	1.08	.54
4	.69	5.34	.50	1.50	.50	1.50	.43	1.08	.43	1.08	.53
5	.67	4.82	.49	1.44	.49	1.44	.43	1.08	.43	1.08	.54
6	.66	4.56	.50	1.50	.48	1.38	.44	1.14	.52	1.80	.52
7	.67	4.82	.50	1.50	.48	1.38	.44	1.14	.50	1.50	.53
8	.68	5.08	.51	1.80	.48	1.38	.44	1.14	.50	1.50	.53
9	.70	5.60	.51	1.80	.48	1.38	.44	1.14	.50	1.50	.55
10	.67	4.82	.51	1.80	.48	1.38	.44	1.14	.50	1.50	.63
11	.60	3.00	.51	1.80	.48	1.38	.44	1.14	.48	1.38	.60
12	.60	3.00	.51	1.80	.48	1.38	.44	1.14	.63	3.52	.56
13	.60	3.00	N.C.	N.C.	.49	1.38	.47	1.32	.55	2.25	.54
14	.60	3.00			.49	1.38	.47	1.32	.50	1.50	.66
15	.59	2.85			.49	1.38	.46	1.26	.53	1.95	.71
16	.58	2.70			.49	1.38	.43	1.08	.53	1.95	.75
17	.57	2.55			.49	1.38	.43	1.08	.57	2.55	★
18	.57	2.55			.49	1.38	.44	1.14	.60	3.00	★
19	.56	2.40			.49	1.38	.45	1.20	.59	2.85	★
20	.55	2.25			.50	1.50	.44	1.14	.57	2.55	★
21	.55	2.25			.50	1.50	.43	1.08	.55	2.25	★
22	.54	2.10			.50	1.50	.42	1.02	.55	2.25	★
23	.54	2.10			.50	1.50	.43	1.08	.54	2.10	★
24	.53	1.95			.47	1.32	.42	1.02	.55	2.25	★
25	.53	1.95			.45	1.20	.42	1.02	.53	1.95	★
26	.52	1.80			.44	1.14	.42	1.02	.53	1.95	★
27	.52	1.80			.44	1.14	.42	1.02	.52	1.80	★
28	.52	1.80			.44	1.14	.42	1.02	.51	1.65	★
29	.52	1.80			.42	1.02	.42	1.02	.51	1.65	★
30	.52	1.80	.51	1.80	.41	.96	.43	1.05	.51	1.65	★
31	.52	1.80	.51	1.80			.44	1.14			3.20

175 days 100.13 131.11
3.24 .77 -9- 1.37 1.11
1.17 1.99 47 81 108
1.11 1.87 111 260

QUEEN'S TOWN NEW YORK TIDE GAUGE

1-169

OFFICE - EST. Unlocked roof with Water Licenses Division

DAYS	JAN		FEB		MARCH		APRIL		MAY		JUNE	
	G.H.	Q	G.H.	Q	G.H.	Q	G.H.	Q	G.H.	Q	G.H.	Q
1	3.0	A	40.0	A	37.0	A	67.0	A	44.0	1.52	37.40	
2	2.9		36.0		21.0		62.0		43.0	1.52	37.40	
3	2.8		34.0		16.0		58.0		43.0	1.51	36.95	
4	2.6		32.0		14.0		57.0		43.0	1.51	36.95	
5	2.5		30.0		14.0		55.0		42.0	1.51	36.95	
6	2.4		42.0		14.0		53.0		42.0	1.51	36.95	
7	2.3		26.0		12.0		51.0		42.0	1.51	36.95	
8	2.3		23.0		12.0		50.0		41.00	1.51	36.95	
9	2.2		21.0		12.0		49.0		41.0	1.50	36.50	
10	2.2		21.0		12.0		49.0		41.0	1.50	36.50	
11	2.1		20.0		11.0		49.0		41.0	1.50	36.50	
12	2.1		19.0		10.0		49.0		40.0	1.50	36.50	
13	2.1		17.0		9.4		49.0		40.0	1.50	36.50	
14	54.0		17.0		9.0		48.0		39.0	1.49	36.07	
15	45.0		17.0		9.1		48.0		39.0	1.46	34.80	
16	14.0		16.0		9.2		48.0		38.0	1.45	34.37	
17	5.0		16.0		9.4		47.0		37.0	1.45	34.37	
18	10.0		15.0		9.6		47.0		37.0	1.45	34.37	
19	78.0		14.0		10.0		47.0		37.0	1.45	34.37	
20	78.0		13.0		10.0		46.0		37.0	1.43	33.52	
21	73.0		12.0		11.0		46.0	1.52	37.40	1.45	34.37	
22	78.0		12.0		12.0		46.0	1.53	37.85	1.46	34.80	
23	78.0		11.0		13.0		46.0	1.53	37.85	1.46	34.80	
24	78.0		25.0		15.0		45.0	1.53	37.85	1.46	34.80	
25	78.0		40.0		18.0		45.0	1.54	38.30	1.45	34.37	
26	78.0		52.0		22.0		45.0	1.54	38.30	1.46	34.80	
27	78.0		48.0		25.0		45.0	1.53	37.85	1.46	34.80	
28	6.00		43.0		30.0		45.0	1.53	37.85	1.45	34.37	
29	56.0				42.0		44.0	1.54	38.30	1.45	34.37	
30	50.0				54.0		44.0	1.53	37.85	1.45	34.37	
31	45.0				76.0			1.53	37.85			

SUMMARY
1073.5 712.0 578.7 1480.0 1223.9 1066.7
34.8 25.4 18.7 49.3 39.5 35.8

DE - FISHING NEALS - SOUTHERN LINE. CALIF. -
1969

Sect	Q	FISH		FISH		Sect	Q
		SH	Q	SH	Q		
1	1.45	34.37	130	17.20	.65	6.11	5.3
2	1.45	34.37	130	17.20	.65	5.11	4.9
3	1.45	34.37	130	17.20	.65	5.11	4.75
4	1.44	33.9	76	3.28	.05	4.71	4.25
5	1.44	33.9	76	0	.05	4.91	4.25
6	1.45	34.3	76	0	.05	4.71	4.25
7	1.45	34.3	76	5.1	.75	5.11	5.8
8	1.45	34.3	76	4.1	.55	5.11	4.5
9	1.41	32.4	76	3.5	.52	4.91	4.25
10	1.41	32.4	76	2.9	.55	4.71	4.25
11	1.40	32.2	76	2.5	.65	4.91	4.25
12	1.40	32.2	76	2.1	.65	4.91	4.25
13	1.40	32.0	76	1.7	.65	4.71	4.1
14	1.40	32.0	76	1.5	.65	4.71	4.1
15	1.40	32.0	76	1.2	.65	4.71	4.1
16	1.40	32.0	76	1.0	.65	4.71	4.1
17	1.40	32.0	76	.86	.65	4.71	4.1
18	1.39	31.5	76	.72	.65	4.71	4.25
19	1.39	31.5	76	.61	.65	4.71	4.25
20	1.37	30.5	76	.50	.65	4.71	4.25
21	1.35	29.6	81	170	.65	5.11	4.75
22	1.35	29.6	76	284	.65	4.30	3.75
23	1.35	29.6	77	256	.65	4.30	3.75
24	1.35	29.6	76	353	.65	4.71	4.1
25	1.35	29.6	75	277	.65	4.53	3.8
26	1.35	29.6	74	774	.65	4.30	3.75
27	1.35	29.6	74	774	.65	4.30	3.75
28	1.34	27.12	73	6.41	.65	4.30	3.75
29	1.35	28.64	73	7.41	.65	4.11	4.25
30	1.34	27.12	71	6.88	.65	4.91	4.25
31	1.33	28.64	68	6.05			

Divisional Catching Curve.

Days 779.32 215.63 149.01 128.15
31.59 1.00 1.31 0.01

1968-69

TABLE B-4 (Cont.)

AN DISCHARGE
IN CUBIC FEET PER SECOND

Y	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	DAY			
													WATER YEAR	STATION NO.	STATION NAME	
														1969	867920	BIG CREEK DIVERSION NEAR FISH CAMP
2.6	3.0	5.3	36	5.7	42	7.0	4.6	45	45	8.3	5.2	1				
2.8	3.0	5.0	35	6.6	43	6.8	4.6	45	45	8.3	5.0	2				
2.8	3.0	6.3	35	4.6	43	6.6	4.6	45	44	7.8	5.0	3				
2.8	2.9	6.1	26	4.6	42	6.3	4.6	45	43	7.6	5.0	4				
2.9	2.8	6.8	7.6	6.8	43	6.1	4.6	45	42	7.2	5.0	5				
2.8	4.5	7.0	8.1	23	39	6.1	4.6	45	40	7.0	4.8	6				
2.8	4.8	5.9	8.6	25	26	6.1	34	45	39	7.0	5.9	7				
2.9	4.6	7.2	8.6	27	24	5.9	44	44	38	6.8	5.2	8				
2.8	4.8	5.0	8.1	19	23	5.7	44	45	36	6.6	5.0	9				
2.8	4.6	6.6	8.6	5.7	23	5.7	45	43	35	6.6	5.0	10				
2.8	4.6	8.3	8.1	5.7	15	5.7	45	47	33	6.6	5.0	11				
3.0	7.6	9.8	8.1	5.7	13	5.5	46	48	32	6.1	5.0	12				
3.4	6.1	14	24	6.6	12	5.5	46	49	33	6.1	4.8	13				
3.0	5.5	15	29	5.9	8.3	5.5	47	49	32	5.9	4.8	14				
3.0	6.3	27	27	7.0	4.3	5.3	47	51	28	5.5	4.8	15				
3.0	6.3	11	23	8.1	4.5	5.2	44	52	25	5.5	4.8	16				
3.0	6.1	11	16	7.0	5.0	5.2	45	52	24	6.1	4.6	17				
3.0	7.2	11	24	6.6	5.7	5.0	47	51	22	5.9	4.6	18				
3.0	7.0	20	23	6.6	5.9	5.0	35	50	20	5.5	4.6	19				
3.0	6.6	17	9.3	6.6	7.0	4.8	7.4	50	18	5.5	4.8	20				
3.0	6.1	26	8.6	7.4	18	4.6	31	50	15	5.9	5.0	21				
3.0	5.9	35	7.0	6.6	6.6	4.6	45	49	14	5.9	5.0	22				
3.0	5.7	35	6.8	6.8	6.6	4.6	45	49	13	5.7	4.6	23				
3.0	5.9	37	6.6	21	6.6	4.6	45	49	12	5.5	4.8	24				
3.0	5.5	36	8.1	23	6.6	4.6	45	48	11	5.5	4.6	25				
3.0	5.5	40	7.6	27	6.6	4.6	45	47	11	5.5	4.5	26				
3.0	5.2	36	6.3	35	6.6	4.6	45	47	11	5.5	4.3	27				
3.0	5.0	39	17	41	6.8	4.6	45	46	11	5.5	4.1	28				
3.0	5.0	39	27		6.8	4.6	45	46	10	5.3	4.1	29				
3.0	5.0	38	21		7.0	4.6	45	46	9.3	5.2	4.1	30				
3.0	37	16			7.0	45			8.8	5.0		31				
	5.2	19.5	16.3	13.1	16.6	5.4	35.0	47.4	25.8	6.2	4.8					
	7.6	40	35	41	43	7.0	47	52	45	8.3	5.9					
	2.8	5.0	6.3	4.6	4.3	4.6	4.6	43	8.8	5.0	4.1					
181	310	1197	1002	726	1019	319	2152	2822	1505	382	296					

MEAN DISCHARGE 16.5	MAXIMUM				MINIMUM				TOTAL ACSF' FT 11980
DISCHARGE	GAGE HT.	MO.	DAY	TIME	DISCHARGE	GAGE HT.	MO.	DAY	TIME

LOCATION			MAXIMUM DISCHARGE			PERIOD OF RECORD			DATUM OF GAGE		
LATITUDE	LONGITUDE	1/4 SEC. T. & R. M.D.S. & M.	OF RECORD			DISCHARGE	GAGE HEIGHT ONLY	PERIOD		ZERO ON GAGE	REF. DATUM
			CFS	GAGE HT.	DATE			FROM	TO		
37 28 10	119 36 52	NE25 SS 21E	3.58	1-30-63	DEC 58-DATE			1958		0.00	LOCAL
Station located 195 feet upstream from road culvert, 1.4 miles southeast of Fish Camp. This is regulated diversion from Big Creek to Lewis Fork, Fresno River. Stage-discharge relationship at time affected by ice and extreme high flows affected by 36-inch culvert pipe below station. Altitude of gage is approximately 5,400 feet (from topographic map). Records furnished by Madera Irrigation District.											

SAN JOAQUIN RIVER BASIN

111

11250500 FRESNO RIVER NEAR BAKULTON, CALIF.--CONTINUED

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1966 TO SEPTEMBER 1967

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
1			5.7	10	7.3	6.13	6.270	6.06	216	109	125	24	13
2			5.7	11	6.5	5.95	5.650	5.66	209	101	121	27	13
3			5.7	12	6.6	5.95	5.650	5.66	209	102	127	25	13
4			5.7	13	6.3	5.95	5.650	5.66	209	103	127	22	13
5			5.7	14	6.5	5.95	5.650	5.66	209	103	125	20	11
6			5.7	15	6.5	5.95	5.650	5.66	209	103	125	20	11
7			5.7	16	6.6	5.650	5.66	5.750	203	107	121	26	13
8			5.7	17	5.5	5.5	5.100	5.62	942	202	104	26	13
9			5.7	18	5.5	5.5	5.100	5.62	919	213	102	27	13
10			5.7	19	5.5	5.5	5.100	5.62	915	215	102	27	13
11			5.7	20	5.5	5.5	5.100	5.62	916	204	105	18	13
12			5.7	21	5.5	5.5	5.100	5.62	916	204	105	18	13
13	2.0	2.0	5.7	22	11.3	7.20	8.750	8.27	207	109	105	22	13
14	2.0	2.0	5.7	23	11.3	7.20	8.750	8.27	207	109	105	22	13
15	2.0	2.0	5.7	24	11.3	7.20	8.750	8.27	207	109	105	22	13
16	2.0	2.0	5.7	25	11.3	7.20	8.750	8.27	207	109	105	22	13
17	2.0	2.0	5.7	26	11.3	7.20	8.750	8.27	207	109	105	22	13
18	2.0	2.0	5.7	27	11.3	7.20	8.750	8.27	207	109	105	22	13
19	2.0	2.0	5.7	28	11.3	7.20	8.750	8.27	207	109	105	22	13
20	2.0	2.0	5.7	29	11.3	7.20	8.750	8.27	207	109	105	22	13
21	2.0	2.0	5.7	30	11.3	7.20	8.750	8.27	207	109	105	22	13
22	2.0	2.0	5.7	31	11.3	7.20	8.750	8.27	207	107	27	27	13
23	2.0	2.0	5.7	1	11.3	7.20	8.750	8.27	206	201	25	25	13
24	2.0	2.0	5.7	2	11.3	7.20	8.750	8.27	206	202	25	25	13
25	2.0	2.0	5.7	3	11.3	7.20	8.750	8.27	206	203	25	25	13
26	2.0	2.0	5.7	4	11.3	7.20	8.750	8.27	206	204	25	25	13
27	2.0	2.0	5.7	5	11.3	7.20	8.750	8.27	206	205	25	25	13
28	2.0	2.0	5.7	6	11.3	7.20	8.750	8.27	206	206	25	25	13
29	2.0	2.0	5.7	7	11.3	7.20	8.750	8.27	206	207	25	25	13
30	2.0	2.0	5.7	8	11.3	7.20	8.750	8.27	206	208	25	25	13
31	2.0	2.0	5.7	9	11.3	7.20	8.750	8.27	206	209	25	25	13
TOTAL	95.7	507.4	2,200	26,610	29,562	26,210	16,712	8,108	5,785	2,657	601	307	
MEAN	3.20	16.6	72.9	1,120	1,042	901	557	203	176	65.7	22.6	12.7	
MAX	2.0	2.0	5.7	278	8.245	7.254	8.170	1,070	316	204	125	16	
MIN	2.0	2.0	5.7	19	0.6	0.550	0.70	320	107	129	29	13	
AC-FT	389	1,170	4,500	67,000	77,681	68,000	33,150	16,150	10,000	5,270	1,750	750	

CAL YR 1966 TOTAL 10,532.81 MEAN 39.7 min 0 AC-FT 28,620

OCT 1966 TOTAL 135,328.66 MEAN 371 min 0 AC-FT 268,000

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1967 TO SEPTEMBER 1968

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			22	52	122	122	122	115	97	37	24	33
2			23	52	121	121	121	115	70	32	19	33
3			23	51	121	121	121	115	76	32	19	33
4			24	50	121	120	120	109	72	31	19	33
5			24	50	122	122	122	109	70	30	17	33
6			25	50	122	122	122	109	70	30	17	32
7			25	50	122	122	122	107	68	29	17	32
8			26	50	122	122	122	107	68	29	17	32
9			26	51	121	121	121	107	68	29	17	32
10			26	51	121	121	121	107	68	29	17	32
11			27	52	121	121	121	112	105	22	17	32
12			27	51	122	122	122	112	105	22	17	32
13			28	50	122	122	122	112	105	22	17	32
14			28	50	122	122	122	112	105	22	17	32
15			29	50	122	122	122	112	105	22	17	32
16			29	50	122	122	122	112	105	22	17	32
17	2.0	2.0	5.7	30	122	122	122	112	105	22	17	32
18	2.0	2.0	5.7	31	122	122	122	112	105	22	17	32
19	2.0	2.0	5.7	1	122	122	122	112	105	22	17	32
20	2.0	2.0	5.7	2	122	122	122	112	105	22	17	32
21	2.0	2.0	5.7	3	122	122	122	112	105	22	17	32
22	2.0	2.0	5.7	4	122	122	122	112	105	22	17	32
23	2.0	2.0	5.7	5	122	122	122	112	105	22	17	32
24	2.0	2.0	5.7	6	122	122	122	112	105	22	17	32
25	2.0	2.0	5.7	7	122	122	122	112	105	22	17	32
26	2.0	2.0	5.7	8	122	122	122	112	105	22	17	32
27	2.0	2.0	5.7	9	122	122	122	112	105	22	17	32
28	2.0	2.0	5.7	10	122	122	122	112	105	22	17	32
29	2.0	2.0	5.7	11	122	122	122	112	105	22	17	32
30	2.0	2.0	5.7	12	122	122	122	112	105	22	17	32
31	2.0	2.0	5.7	13	122	122	122	112	105	22	17	32
TOTAL	869	869	1,672	9,264	9,270	9,255	9,012	3,123	1,672	871.0	23,71	31,78
MEAN	26.7	26.7	57.5	268	120	120	120	101	62.6	13.6	7.56	1.66
MAX	120	92	100	2,320	200	1,000	120	115	65	37	2.0	1.66
MIN	11	23	22	33	01	01	01	02	12	20	2.1	0.92
AC-FT	1,763	1,763	2,092	10,934	9,270	10,934	9,012	3,123	2,092	871.0	23,71	31,78

69-70

II. RIVER REACHES AND LOSSES

II. River reaches and losses

River reaches and losses are taken as follows:

<u>Location</u>	<u>Reach No.</u>	<u>Loss</u>
Hidden Dam	1	11 cfs
Madera Canal	2	4
Upper Island	3	11
Franchi Dam	4	0
Below Franchi	5	25
Road 16	6	4
Triangle T		
	Total	55 cfs

^All loss figures are based on measurements made on June 21, 22, 25, 27 and 29 and July 2, 1979, when releases from Hidden Dam varied from 309 to 410 cfs, except that no measurement was made at Upper Island. Losses in the Madera Canal-Franchi Dam reach were measured as 15 cfs and have been divided 4-11 cfs as shown.

Rationale for reach termini are as follows:

Hidden Dam - point of controlled release.

Madera Canal - M.I.D. may release Madera Canal water to the river. If this is done, the water, less a proportionate share of Reach 2 and 3 losses, belongs to M.I.D. in addition to M.I.D.'s share of natural river flow and all other imported water reaching Franchi Dam. No Madera Canal imports are assumed in this study but may occur in actual operations.

Upper Island - approximate beginning of M.I.D.'s service to M.I.D. riparian land via Island Laterals or separate pumps.

Franchi Dam - M.I.D.'s diversion to Main Canal of M.C. and I. system and location of diversion under M.I.D.'s adjudicated 200 cfs right (see Section III).

Road 16 - location of Reclamation Board weir and river outlet. Sallaberry, Averill and Glantz have facilities for diverting from the river at or just upstream of the weir.

Triangle T - location of Triangle T's gravity diversion facilities and place of diversion under Application 11003.

III. M.I.D.'S ADJUDICATED RIGHT AT FRANCHI DAM

III. M.I.D.'s adjudicated right at Franchi Dam

As successor to Madera Canal and Irrigation Company, M.I.D. is entitled to divert, at Franchi Dam, all flow up to 200 cfs including water imported from Big Creek and Soquel. The right is an adjudicated right and has been exercised for many decades.

Upstream riparian owners can deplete natural flows before those flows reach Franchi but can have no claim on imported Soquel, Big Creek or Madera Canal water.

In this study, river losses in Reaches 1, 2 and 3 are allocated between natural flow and imported water in proportion to the amounts of each at the head of each reach. For example, with 101 cfs of natural flow and 10 cfs of imported water available at Hidden Dam, the 11 cfs of losses in Reach 1 are allocated 10 cfs to natural flow and 1 cfs to imported water, leaving 91 cfs of natural flow and 9 cfs of imported water at the Madera Canal crossing.

With M.I.D. voluntarily allowing P.G. and E. to use Soquel water at Bass Lake under contract, M.I.D.'s adjudicated right is reduced to 200 cfs less the amount of Soquel water so relinquished which otherwise would reach Franchi Dam. Accordingly, with the first 4 cfs of Soquel diversion being lost en route to Hidden, M.I.D.'s entitlement to natural flow under its adjudicated right may vary from 200 cfs (when there is no Soquel or Big Creek water reaching Franchi Dam), to 200 -46 -losses Daulton-Franchi, including Big Creek imports reaching Franchi, when M.I.D.'s Soquel entitlement is 50 cfs and 49 cfs thereof bypasses the diversion under the P.G. and E. contract. When M.I.D.'s Soquel entitlement is, say, 25 cfs, only 1 cfs is diverted and the adjudicated natural flow right at Franchi is reduced to 200 -21 -losses Daulton-Franchi, including Big Creek imports reaching Franchi.

IV. OTHER LOSS TREATMENT AND APPORTIONMENT

IV. Other loss treatment and apportionment

The study does not reflect any riparian diversions in Reach 1 since none are being made (other, perhaps, than for cattle watering from pools fed with seepage in the reach).

When combined natural and imported flows passing Madera Canal are not adequate to meet Reach 2 losses no water is available for Reach 2 riparian demand.

When combined natural and imported flows passing Madera Canal are not large enough to meet both Reach 2 and 3 losses and there is enough natural flow to meet part or all of the Reach 2 riparian demand, that demand is met to the extent natural flow is available and no water is delivered to Reach 3 riparians.

When combined natural and imported flows passing Madera Canal are more than enough to meet Reach 2 and 3 losses, and there is more than enough natural flow to meet Reach 2 riparian demand but not enough to meet both Reach 2 and riparian demands, the available natural flow is apportioned first to natural flow losses in the two reaches and then to the riparian demand in each reach.

When combined natural and imported flows passing Madera Canal are more than enough to meet losses in Reaches 2 and 3, and the natural flows are more than adequate to meet riparian demands in both reaches, all remaining imported water and, within the total permissible diversion under M.I.D.'s adjudicated right as adjusted by any Soquel bypass to P.G. and E., all remaining natural flows, are assumed diverted at Franchi Dam.

When 25 cfs or less passes Franchi Dam (being excess to M.I.D.'s adjudicated right as adjusted for Soquel bypass to P.G. and E.), all such flow is assumed lost and no riparian diversions are made at or below Franchi Dam.

When 26 to 29 cfs passes Franchi Dam (as excess to M.I.D.'s adjusted adjudicated right) the flow in excess of 25 cfs of losses in Reach 5 is apportioned to Reach 5 riparians, including riparians serviceable from M.I.D.'s Main Canal system, and no riparian diversions are assumed in Reach 6.

When 30 or more cfs passes Franchi Dam (as excess to M.I.D.'s adjusted adjudicated right) the available flow is apportioned among riparians in Reach 5, including riparians serviceable from M.I.D.'s Main Canal system, and Reach 6. Assumed diversions for each right are limited to monthly demand and, in the case of native pasture, to 3/4 AF/A in any period of 30 successive days.

When flow passing Franchi Dam (as excess to M.I.D.'s adjudicated right) exceeds the sum of Reach 5 and 6 losses and riparian demands, including riparians serviceable from M.I.D.'s Main Canal system, that excess is considered available first for satisfaction of Sallaberry's appropriation under Application 13541 and then under M.I.D.'s Application 15287.

Satisfaction of Triangle T's appropriation under Application 11003 is not reflected directly in the computer study. Separate analysis of flows in the computer study identifies the dates during the analysis period when such water is available, the amounts of water available, and the impact, if any, of takings under the Triangle T appropriative right on the junior appropriative rights of Sallaberry and M.I.D. (see Section XIII).

When flows passing Franchi Dam (as excess to M.I.D.'s adjudicated right) exceed the sum of Reach 5 and 6 losses and riparian demands and appropriations under Sallaberry's Application 13541 and M.I.D.'s Application 15287, the excess is regarded as spill to the San Joaquin River via East Side Bypass and/or Fresno River. Adjustments to reflect Triangle T's appropriation under Application 11003 generally reduce this spill but on

occasion may reduce water available to satisfy M.I.D.'s Application 15287 or Sallaberry's Application 13541 (see Section XIII).

V. RIPARIAN LAND

V. Riparian land

General

(1) Location of riparian land between Hidden Dam and the west boundary of Triangle T Ranch was determined after plotting on U.S.G.S. quadrangles (1) the boundaries of all original patents as recorded in the Sacramento office of B.L.M., (2) the boundaries of existing ownerships as shown in the records of Madera County, and (3) the location(s) of the channel(s) of Fresno River as shown on available editions of maps beginning with original public lands surveys.

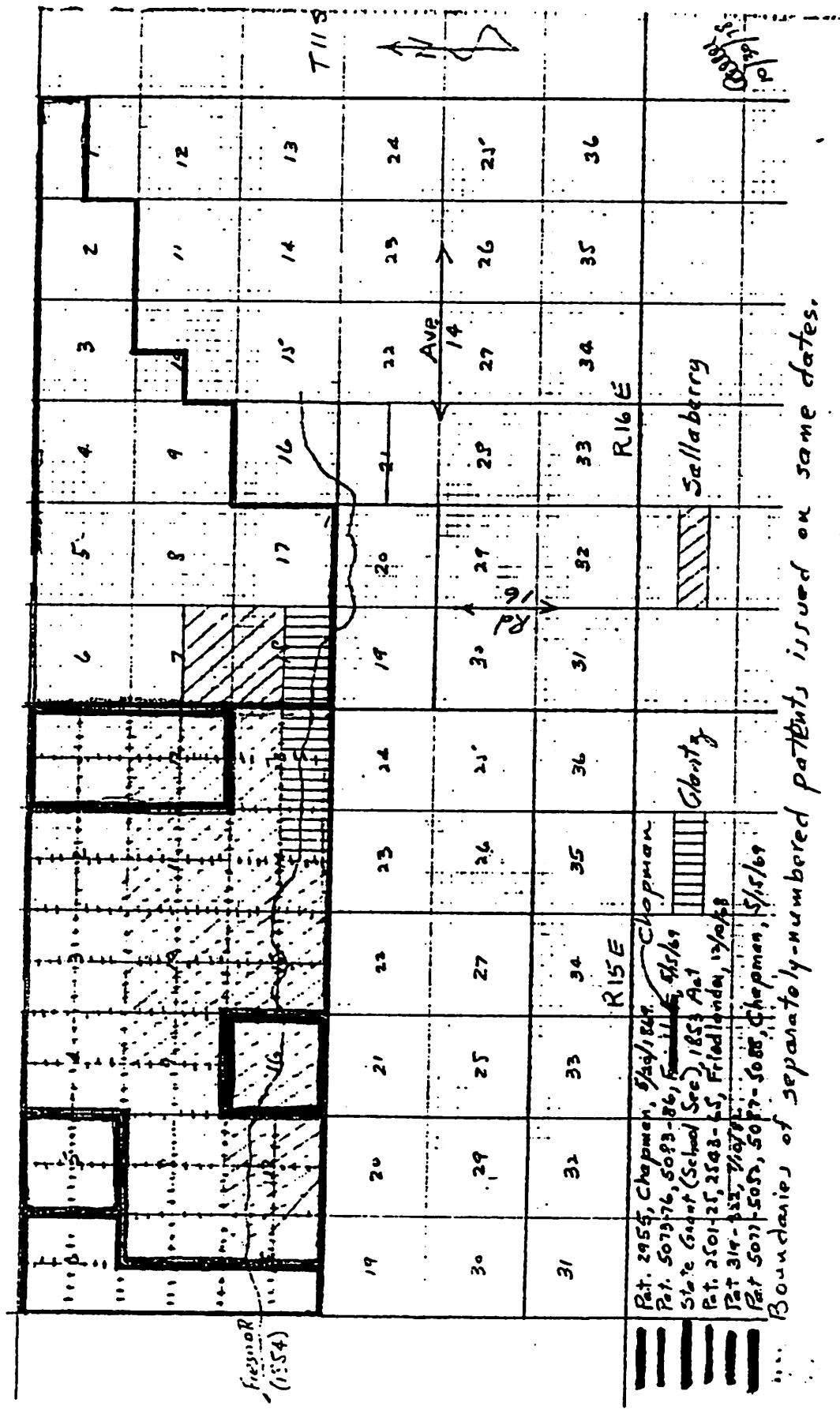
(a) Each patent which contained a bank of Fresno River on the date of patent was considered riparian on that date.

(b) The portion of each originally-riparian patent now in an ownership containing a bank of the river was considered riparian.

(c) The portion of each originally-riparian patent now in an ownership which does not contain a bank of the river was considered to have lost its riparian status. Generally no effort was made, via review of deeds or otherwise, to determine whether in past ownership transfers reservations of riparian rights to such land not in contact with the river had been made.

(d) No title search was made to determine whether any part of a present ownership now in contact with the stream and within an originally-riparian patent had, in some past transfer, been severed from the river.

(e) Where a part of any otherwise-presently-riparian ownership is outside the Fresno River watershed that part is considered non-riparian to the river.



Boundaries of separately-numbered parishes issued on same dates.

(c) The red area which includes Sallaberry's two half-sections in T11S, R16E originally was a 6,000+ A patent to W. S. Chapman on May 20, 1869. Glantz presently owns the S $\frac{1}{2}$ Sec. 18 in a chain of title initiated before the Sallaberry acquisition of the two half-sections. Legal review of the deeds leading to Glantz' present ownership reveals no formal reservation of the riparian right on the back land nor any reservation of right-of-way for a conveyance channel across the Glantz half-section. Sallaberry acquired the two half-sections in 1936. In an interview with Lee Gunter, an old timer who helped Roger Averill construct a channel in the area, this work was done after the 1938 flood. Thus it appears clear that when John Sallaberry acquired the present holding late in 1936 there was no physical connection between the river and the two half-sections in T11S, R16E. Accordingly, the two half-sections are considered non-riparian.

(d) The orange and light-blue areas, being outside the present Sallaberry holding, are not of concern.

(e) The purple area was patented by Isaac Friedlander on December 10, 1868. The area consisted of 48 separately-numbered 160-A tracts purchased by Friedlander with script on January 27, 1868. A separate patent was issued for each 160-A tract stating that the script was for purchase of that specific quarter-section.

The following tracts patented by Friedlander at the time and now owned by Sallaberry contained a bank of the river:

T11S, R15E

Sec. 14	W $\frac{1}{2}$
Sec. 15	All
Sec. 17	N $\frac{1}{2}$
Sec. 18	NE $\frac{1}{4}$

A legal opinion secured by M.I.D. concludes that the most logical interpretation of the law is that only these nine tracts were riparian at the time of patent.

In the circumstance, and realizing that both approaches can be analyzed by the computer at little cost, two different assumptions are made as to Sallaberry's irrigable riparian land. Table V-1 shows a total of 1,829.74 A in the five sections (14-18, incl.) along the south side of the ranch and Table V-2 shows 2,896 A derived for the larger area. Areas primarily are those shown on Madera County Assessor's maps.

Both tables show reductions in gross area by reason of the existence of the new Fresno River bypass channel which extends along the south side of Secs. 14, 15 and 16, thence adjacent to the old Chowchilla Canal in Secs. 17 and 18. This leveed channel is considered non-irrigable.

In Table V-2, the acreage in Secs. 9, 10 and 11 estimated to be within the Berenda Creek watershed also is deleted as being non-riparian to Fresno River. Topography is pretty flat in the area but obviously with Berenda Creek running in Secs. 4 and 5, T11S, R16E, the watershed boundary is somewhere in the northern part of the Sallaberry ownership. Available topography plus field inspection indicates it is reasonable to put the boundary on the dirt road extending through Secs. 11 and 10, thence through the southern part of the E $\frac{1}{2}$ Sec. 9.

(3) Triangle T holding

In March, 1975, McGlasson researched the title on each section in Triangle T ranch and, as a result, recommended that certain areas be considered riparian by virtue of the changes in ownership and what he concluded from various data were the locations of Fresno River and certain of its overflow channels (although McGlasson did not have data on which to base estimated flows at which these overflow channels would carry water). McGlasson's report was reviewed, there were exchanges of correspondence between counsel for M.I.D. and Triangle T, and at the meeting in Madera on June 7, 1978, it was agreed to accept

Table V-1

Sallaberry Riparian Land

(Minimum -- on basis only patents touching river were originally riparian. All Sections in T11S, R15E).

<u>Section</u>	<u>Area</u> (Acres)	<u>Total</u> (Acres)	<u>SSJDD</u> (Acres)	<u>Net</u> (Acres)	<u>Total Net</u> (Acres)
SW $\frac{1}{4}$ 14					
S of River	135.0		21.82	113.18	
N of River	25.0			25.0	
NW $\frac{1}{4}$ 14	160.0	320.0		160.0	298.18
15					
S of River	337.61		41.55	296.06	
N of River	298.77	636.38		298.77	594.83
16					
S of River	347.61		38.58	309.03	
N of River	288.70	636.31		288.70	597.73
NE $\frac{1}{4}$ 17 ^{1/}					
S of River	106.3 ^{2/}		11.0 ^{2/}	95.3	
N of River	214.4 ^{2/}	320.7		214.4	309.7
18	41.50	<u>41.5</u>	<u>12.20</u>	29.3	<u>29.3</u>
Totals		1,954.89	125.15		1,829.74

1/ Block 20 of Map of Subdivision 2, Chowchilla Ranch, shows 640 A in whole of Section 17. River channel never was in S $\frac{1}{4}$ of Section. Assessor's Maps 43-04 and 23-25 show acreages only N and S of river, not quarter sections.

2/ Acreages planimetered from Assessor's Map 23-25.

Table V-2
 Sallaberry Holding
 (And maximum riparian area)

<u>Chowchilla Ranch Subdivision</u>			<u>S/T/R</u>	<u>Judge- ment Area^{2/} (Acres)</u>	<u>Assessor Area (Acres)</u>	<u>SSJDD^{5/} (Acres)</u>	<u>Berenda Exclu- sion^{6/} (Acres)</u>	<u>Net Riparian Area (Acres)</u>
E $\frac{1}{2}$	Blk 10		E $\frac{1}{2}$ 9/11S/15E	320	314.56	--	252	63
	Blk 11		10/11S/15E	640	632.74	--	475	158
	Blk 12		11/11S/15E	640	636.37	--	382	254
	Blk 13		12/11S/15E	640	--	--	--	--
S $\frac{1}{2}$	Blk 14		S $\frac{1}{2}$ 7/11S/16E	308.85	--	--	--	--
N $\frac{1}{2}$	Blk 15		N $\frac{1}{2}$ 18/11S/16E	310.01	--	--	--	--
N $\frac{1}{2}$	Blk 16		N $\frac{1}{2}$ 13/11S/15E	320	320	--	--	320
N $\frac{1}{2}$ SW $\frac{1}{4}$	Blk 17		N $\frac{1}{2}$ SW $\frac{1}{4}$ 14/11S/15E	480	480	21.82	--	458
	Blk 18		15/11S/15E	640	636.38	41.55	--	595
	Blk 19		16/11S/15E	640	636.31	38.58	--	598
Blk 20 ^{1/}			17/11S/15E ^{1/}	477.96 ^{3/}	477.96	57.21	--	421
Blk 21 ^{1/}			18/11S/15E ^{1/}	41.5 ^{3/}	41.50	12.20	--	29
				5,458.32 ^{4/}	4,175.82	171.36	1,109	2,896

1/ Portion East of Chowchilla Canal.

2/ Per 1912 map cited in Judgement except 3/.

3/ From latest County Assessor plats.

4/ 1937 deed totals 5,546.01 A. Total, using Assessor acreages for all Blocks, is 5,431 A.

5/ Bypass area of San Joaquin Drainage District.

6/ In Berenda Creek watershed.

McGlasson's acreages in part of the area. As respects other areas in Secs. 21, 22 and 23 there was no agreement.

Riparian areas agreed upon and those in dispute are shown in Table V-3. Agreed upon were 2,121 A and in dispute were 662 A for a total of 2,783 A. It was agreed that both acreages would be reflected in computer studies to determine the effects on riparian diversions.

Table V-3
 Claimed Riparian Areas in Triangle T Ranch
 T11N, R14E

<u>Section</u>		<u>McGlasson</u>
	<u>Parcel</u> ^{1/}	<u>Area</u>
7	1,2	160 A
8	4	46
	5	50
	6	30
	9	138
	10	22
14	3,4	160
	2	80
15	2	320
	1	320
16	1,3	557
17	1,2,3,4	<u>238</u>
	Total	2,121 A

		<u>In Dispute</u>
21	1,2,4 5,7,8	182 A
22	1,2	320
23	1,2	<u>160</u>
	Total	662 A
	Grand Total	2,783 A

^{1/} Per McGlasson 3/75 report, pp. 13-16, 21-26, 29-35.

VI. APPROPRIATIVE PLACES OF USE

VI. Appropriative places of use

In order of priority date, pertinent appropriative rights are held as follows:

(1) Triangle T

One half of Application 11003, filed March 9, 1945, Permit 7582A, License 9073. The license is for diversion of 17.5 cfs from February 1 to July 15 of each year on the following place of use:

Sec. 14	63.0 A	Sec. 21	380.0 A
15	102.5	22	49.0
16	159.7	28	200.0
17	257.5	29	<u>131.0</u>
20	319.5		1,662.2 A

This place of use overlaps the riparian areas agreed upon or remaining in dispute as discussed below (see also Table V-3).

In Table V-3, riparian acreage in Sec. 15 totals 640 A so the above 102.5 A all overlaps.

Table V-3 shows only 238 A of Triangle T land in Sec. 17 so it is considered all the above 257.5 A overlaps.

Table V-3 shows 557 A of riparian land in Sec. 16 so not more than 640 -557 A = 83 A does not overlap. It is possible, even probable, the entire 159.7 A shown above overlaps but for lack of specific location in Section 16 of the appropriative area the non-overlapping area is assumed herein to be 83 A.

Sec. 20 has no riparian land so the above 319.5 A is non-overlapping.

Secs. 28 and 29 are non-riparian so the above 331.0 A do not overlap.

Table V-3 shows 240 A of riparian land in Sec. 14 so the above 63.0 A may not overlap. We cannot be sure, however, with the present data that the entire 63 A is non-overlapping, but this study so assumes.

Of the areas in dispute as to riparianism in Secs. 21 and 22, the appropriative 380 A and 49.0 A, respectively, could be non-overlapping and are so assumed.

Thus it appears $102.5 + 83 + 238$ (257.5) or 423.5 (443.0) A of the 1,642.7 (1,662.2) A definitely overlap riparian areas. Also, $319.5 + 200.0 + 131.0 = 650.5$ A definitely do not overlap. Some portion of the remaining 568.7 A of the appropriative area do not overlap.

:(
(2) Sallaberry

Sallaberry holds License 4689, Permit 9076, on Application 13541. The license is for diversion of 45 cfs from November 1 to July 3 of each year on the following place of use:

<u>T11S, R15E</u>	<u>Area</u>
Sec. 9	20 A
10	80
11	140
12	120
13	320
14	480
15	640
16	640
17	478
18	42
<u>T11S, R16E</u>	
Sec. 18	320
7	40
	3,320 A

From Table V-2 it can be seen that all this land except the 120 A in Sec. 12, T11S, R15E, and the 40 A in S $\frac{1}{2}$ Sec. 7 and the 320 A in the N $\frac{1}{2}$ Sec. 18, both in T11S, R16E, overlaps riparian areas when considering the maximum riparian area of 2,896 A.

In the maximum area study, appropriations are thus considered for $120 + 40 + 320 = 480$ A.

Table VI-1 correlates the land owned by Sallaberry in each section, the wholly riparian areas, and the appropriative places of use to show that of the minimum riparian area a total of 1,300.79 A do not overlap.

Table VI-1
Sallaberry Acreage Under Appropriative Right
(using minimum riparian acreage)

Under A-13541 (Jan. 13, 1950), P-9076, L-4689, Sallaberry can make 45 cfs direct diversion Nov. 1-July 1 each year for irrigation of the following areas:

<u>T/R/Sec.</u>	<u>Area</u>	<u>Acres</u>	<u>Allowed</u>
11S/15E/ 9	E $\frac{1}{2}$	20 A	20 A
10	All	80	80
11	All	140	140
12	All	120	120
13	N $\frac{1}{2}$	320	320
14	NE $\frac{1}{4}$	160	160
14	W $\frac{1}{2}$ *	298.18	
15	All*	594.83	
16	All*	597.73	
17	N $\frac{1}{2}$ *	309.7	
17	S $\frac{1}{2}$	100.79 ^{1/}	100.79 ^{1/}
18	S $\frac{1}{2}$ *	29.3 ^{2/}	
11S/16E/18	N $\frac{1}{2}$	320	320
7	S $\frac{1}{2}$	<u>40</u>	<u>40</u>
		3,130.53 A**	1,300.79 A

* Riparian area. Omitted due to overlap.

1/ Allowing for S.S.J.D.D. area. Total Sec. 17 = 478 A with 57.21 A in S.S.J.D.D. area. Adjustment reflected in S $\frac{1}{2}$ Sec. 17, i.e., 320 + 158 = 478; 320 + 158 - 57.21 = 420.79.

2/ Allowing for S.S.J.D.D. area of 12.20 A.

** SWRCB file shows total acreage 3,558 A. Some, but not all, due to assessor's differing acreages in Secs. 14, 15, 16, 17; reason for remaining difference not known.

VII. IRRIGATED LAND AND PHYSICAL FACILITIES

VII. Irrigated land and physical facilities

All riparian parcels were numbered and a crop survey was conducted in 1978. Results were tabulated on sheets similar to the sample attached.

In general, these crop surveys formed the crop-land acreages used in the study for all parcels except the Triangle T ranch. In the latter case, a detailed 1977-78 crop map prepared by the ranch was used since it appeared consistent with up-to-date aerial photos, was more detailed and was considered more accurate. A copy of this map (the original of which is in color) is attached.

An extensive field investigation was made of the Sallaberry ranch to confirm that the whole was in native pasture.

Capability of using water from Fresno River

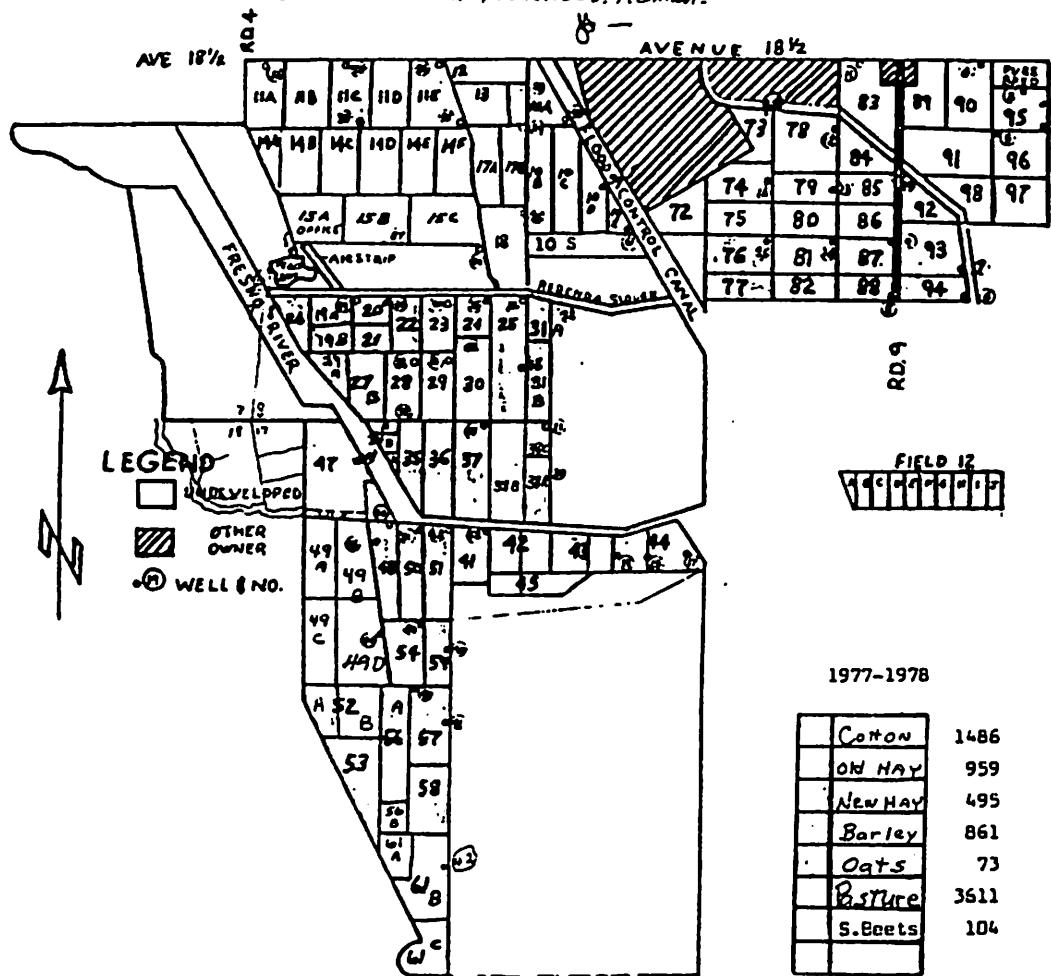
A basic criteria underlying the study was that only parcels now capable physically of diverting water and using it beneficially would be included as diverters at present. It is intended that if and when riparians not now using river water do so in the future, the available natural flow will be re-divided in new computer studies to recognize that use.

To ascertain which riparians are now capable of diverting water, aerial and on-the-ground inspections were made to locate pumps and other diversion facilities. In Section VIII, as noted, individual parcels having water demand in each reach are those having some sort of facility for taking water (usually, but not always, pumps). Riparian parcels within M.I.D. physically serviceable through the Main Canal system heading at Franchi Dam were assumed served; riparian parcels in M.I.D. not capable of service were assumed not served.

NO	SEC/T.R.	OWNER	ADDRESS	TOTAL	RIPARIAN	CROP / ACRES	SECTION 4 OF 7	
							CQ. PARCEL NO	SECTION 4 OF 7
30	26 10/16	State of California		1100	0			
31	26 10/16	Smith, El. A.	145 Laurel St. # 12 San Francisco, Ca 94115	3946	2946	Wheat 1.10 Wheat 38.98	31-201-12	
32	35 10/16	State of California		1100	1100	Wheat 22.00 Wheat 88.00	31-201-01	
33	35 10/16	Smith, El. A.	145 Laurel St. San Francisco, Ca 94110	1500	1500	Wheat 10.00 Wheat 5.00	31-201-03	
34	35 10/16	Smith, El. A.	45 Laurel St. San Francisco, Ca 94106	1190	2190	Pasture Pecans Pecans Pecans	31-202-01	144.00
35	35 10/16	State of California	P.O. Box 332 Modena, Ca 93537	4080	0	Pasture Pecans Pecans Pecans	31-202-02	
36	35 10/16	Doig, Duran	30715 Island Dr. Modena, Ca 93537	3070	3070	Pasture Pecans Pecans Pecans Pecans	31-202-03	
37	35 10/16	Street, Ralph Allouie	31562 Island Dr. Modena, Ca 93537	8625	8625	Pecans Pecans Pecans Pecans Pecans	31-202-04	
38	35 10/16	McCullough, James	15173 Rd. 400 Modena, Ca 93537	1300	0		31-202-05	
NOTES							MASTER ILLUSTRATION DISTRICT CENSUS Section 4 of 7 Section 4 of 7	

TRIANGLE T RANCH, INC.

4408 MAYS DRIVE Rec'd 10-4-77 thru
CHOWCHILLA, CALIF. 1/1r fire losses, itemized. CHOWCHILLA 665-2964



1977-1978

Cotton	1486
Old Hay	959
New Hay	495
Barley	861
Oats	73
Pasture	3611
S. Beets	104

FIELD	ACRES	CROP									
10	385	Past	20	65	Bar.	43	70	Cot	74	65	Past
10 S	77	•	21	65	Bar	44	79	•	75	55	•
11 A	87	•	22	76	Cot	45	51	Alf.O	76	60	Cot
11 B	74	•	23	76	Past	47	171	•	77	60	•
11 C	84	Bar.	24	63	•	48	80	Cot	78	120	Past
11 D	77	Past	25	121	Cot	49 A	73	Alf.O	79	75	•
11 E	86	•	26	85	Alf.N	49 B	71	•	80	65	•
12	90	•	27 A	34	Cot	49 C	80	Alf.O	81	75	•
13	117	•	27 B	55	Alf.O	49 D	112	Bar	82	75	Cot
14 A	53	•	28	74	•	50	70	Alf.O	93	100	Past
14 B	79	•	29	66	Past	51	65	•	84	68	•
14 C	79	•	30	73	•	52 A	50	Cot	85	78	•
14 D	78	•	31 A	24	Bar	52 B	87	Bar	85	70	•
14 E	79	•	31 B	105	•	53	98	Alf.N	87	67	Cot
14 F	77	•	34 A	22	Cot	54	108	Cot	88	68	•
15 A	49	•	34 B	24	•	56 A	156	•	89	80	Past
15 B	90	•	35	98	Bar	56 B	28	•	90	100	•
15 C	90	•	36	108	•	57	72	•	91	95	•
17 A	84	•	37	110	Alf.N	58	80	Alf.N	92	32	S. Beets
17 B	83	•	38 A	70	Alf.C	59	73	Oats	93	73	•
18	102	•	38 B	107	Cot	61 A	60	Cot	94	69	Cot
19 A	46	Alf.N	39 C	30	Alf.N	61 B	100	Alf.O	95	60	Past
19 B	45	•	41	65	Bar	61 C	48	Bar	96	60	•
			42	79	Alf.O	72	41	Past	97	60	•
						73	65	•	98	65	•

There were two major exceptions to the "ability-to-divert" criteria. The first was the Sallaberry ranch, where physical inspection in 1979 showed that most of the necessary Dry Creek diversion structures were either non-existent or so dilapidated as to be unuseable. The other was Triangle T where existing facilities, although somewhat adequate, could not divert water to more than a fraction of the total riparian area.

It is anticipated that negotiations will be conducted with each using riparian and appropriator looking towards developing mechanics under which his entitlement to Fresno River natural flow will be satisfied with due regard to his priority and location on the stream. Fundamental to his entitlement will be his physical ability to divert at the times his entitlement will yield useful water at his diversion point.

With Sallaberry and Triangle T being the two largest riparian users (and the two earliest appropriators) it was assumed for purposes of the study that each had installed or repaired all diversion and conveyance facilities, and was prepared to operate them and did operate them, as necessary to beneficially use their entitlements.

VIII. WATER REQUIREMENTS

VIII. Water requirements

Diversion requirements, except native pasture, were taken from Bulletin 113-1 (1974) of the Department of Water Resources. Table 34 of that Bulletin presents average annual headgate demand (treated in the study as demand at a river diversion point to serve each parcel) for crops in the Madera area of San Joaquin Valley. Table 24 of the Bulletin shows the monthly distribution of the demand.

Table VIII-1 attached shows the monthly demand in AF/A for each of the crops. Where Bulletin 113-1 did not list a crop, a reasonably-similar crop was used.

Native pasture was ignored on all parcels except Sallaberry and Triangle T because of minimal acreages or lack of diversion facilities. The two large users were assumed to divert at full capability (500 cfs in the case of Sallaberry and either 60 or 100 cfs less concurrent crop demand in the case of Triangle T) with a limit of 3/4 AF/A in any 30-day period.

Field inspection of the Sallaberry ranch shows extensive diking and check dams which permit water diverted from Dry Creek channel to flood a very large percentage of the total riparian land. There are 2 or 3 shallow "ravines" and other relief which probably prevent 100% coverage. Nevertheless, the study does not reduce the area. In effect, the study says, "On his maximum riparian area, Sallaberry can use beneficially $3/4 \times 2,896 = 2,172$ AF in a 30-day period; on his minimum riparian area he can use beneficially $3/4 \times 1,830 = 1,372$ AF. His appropriative diversion limit in the maximum-riparian situation is $3/4 \times 480 = 360$ AF in a 30-day period; the limit in the minimum-riparian situation is $3/4 \times 1,301 = 976$ AF."

Table VIII-1

Farm Delivery (headgate) demand -- Madera Area Crops

(Table 34, Bull. 113-1, 1974, Average demand, with
Monthly distribution per Table 24)

AF/A

<u>Crop</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
Alfalfa	--	--	0.33	0.47	0.68	0.80	0.87	0.78	0.57	0.29	--	--	4.79
Barley	0.03	0.13	0.33	0.40	0.35	0.16	--	--	--	--	--	--	1.4
Dry beans	--	--	--	--	--	0.59	1.26	0.55	--	--	--	--	2.4
Field corn	--	--	--	--	--	0.61	1.24	0.93	0.42	--	--	--	3.2
Cotton	--	--	--	--	0.10	0.57	1.18	1.07	0.68	0.30	--	--	3.9
Dec. Orch.	--	--	0.16	0.28	0.47	0.58	0.65	0.55	0.38	0.23	--	--	3.3
Almonds	--	--	0.17	0.30	0.49	0.62	0.69	0.59	0.27	0.16	--	--	3.29
Sorghum(milo)	--	--	--	--	--	0.32	1.16	0.90	0.32	--	--	--	2.7 ✓
Pasture	--	--	0.41	0.58	0.84	0.97	1.01	0.85	0.62	0.43	--	--	5.71 ✓
Citrus	0.08	0.15	0.16	0.23	0.34	0.39	0.40	0.34	0.25	0.17	0.13	0.06	2.7
Beets	--	--	0.09	0.41	0.87	0.98	0.88	0.56	--	--	--	--	3.79
Tomatoes	--	--	--	--	0.20	0.64	0.96	0.78	0.43	--	--	--	3.01 ✓
Vineyard	--	--	--	0.09	0.47	0.72	0.83	0.68	0.43	0.17	--	--	3.39 ✓

Triangle T's native pasture land is no where near as developed with dikes and check dams as is Sallaberry's. To maintain some relativity between the two, the study discounts Triangle T's pasture land by 5%. Thus, Triangle T's maximum riparian area (which includes Secs. 21, 22 and 23) contains 1,399 A of native pasture and is limited, in a 30-day period, to $3/4 \times 0.95 \times 1,399 = 997$ AF. Triangle T's minimum riparian area (excluding Secs. 21, 22 and 23) contains 840 A of native pasture and the 30-day limit is $3/4 \times 0.95 \times 840 = 598.5$ AF.

It is possible that diversion of these amounts to either Sallaberry or Triangle T would require impractical husbanding of diverted water to prevent unreasonable losses through over-irrigation, evaporation or run-off. In this sense, both 30-day allowances in total AF probably are generous.

IX. TRIANGLE T - ROAD 9 OUTLET CAPACITY

IX. Triangle T - Road 9 outlet capacity

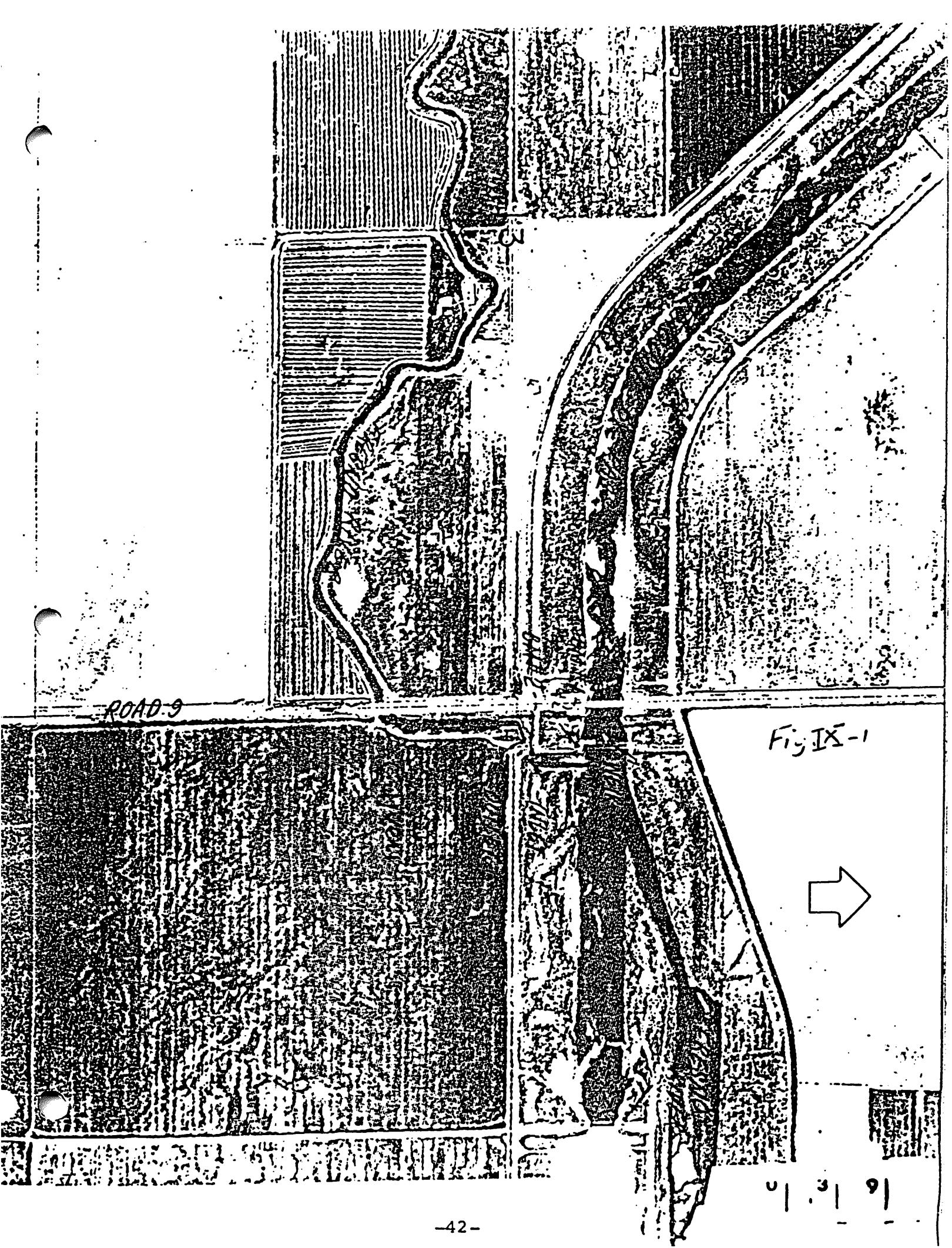
The outlet structure was designed to discharge 100 cfs with inlet water surface at the E.S.B.P. weir crest elevation of 146.9 feet and tailwater at about elevation 146.2 feet (DWR datum). ^{1/} The general area, including channels, is shown on Fig. IX-1.

In 1968, DWR reviewed actual conditions at and below the outlet. Results are shown in Figs. IX-2 and IX-3 attached. DWR found the river channel below the outlet had silted up for a distance of about 8,500 feet and tailwater level, with inlet water surface at the weir crest (146.9 ft.), was at 146.65 feet, while discharge was 60 cfs. ^{2/} DWR estimated about 7,000 cu. yd. of material would have to be removed from the aggraded channel to restore the outlet capacity to 100 cfs. Costs (in 1968) were estimated at \$3,000.

On June 9, 1978, M.I.D. and Triangle T personnel surveyed conditions at and downstream of the outlet structure. As noted current meter measurements showed a discharge of 80 cfs with the outlet gates not fully opened. Velocity measurements at the inlet with the gates fully open -- it being impractical to measure discharge below the outlet at that flow -- indicated 95.4 cfs was entering the outlet. Also, a difference of 0.56 foot in elevations of inlet and outlet water surfaces was measured; this would indicate a discharge of around 87-100 cfs was occurring depending on the discharge coefficient C selected in the formula $Q = CA\sqrt{2gh}$ and fairly well checks the inlet flow measurement. See attached memo IX-4.

1/ w/ $H = 146.9 - 146.2 = 0.7'$, and 24 sq. ft. opening,
 $Q = 0.62 \times 24 \times \sqrt{64.4 \times 0.7} = 99.91 \text{ cfs}$

2/ w/ $H = 146.9 - 146.65 = 0.25$
 $Q = 0.62 \times 24 \times \sqrt{64.4 \times 0.25} = 59.7'$



ROAD 9

Fig IX-1

155
 154
 153
 152
 151
 150
 149
 148
 147
 146
 145
 144
 143
 142

155
 154
 153
 152
 151
 150
 149
 148
 147
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 145
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 143
 142

Levee Protection - ELEV 153.4

155
 154
 153
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155
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 143
 142

FRESCO RIVER
 IRRIGATION STRUCTURE
 RATING CURVES

J. Lindner

7-5-88

DESIGN M.S. - ELEV 154.2

Eastside Bypass Flow
 (upstream of drop)
 structure

Eastside Bypass
 Drop Structure
 Weir Crest and
 Channel Invert
 ELEV. = 152.9

(ESBP)
 (127166)

(ESBP)
 (128167) @
 9:50 AM

O.G.L.

Fresno River Irrig.
 Structure Drop
 Side Gate Fully
 Open
 (ESBP)
 (126167)

Fresno River Irrig.
 Structure Drop
 Side Gate Fully
 Open

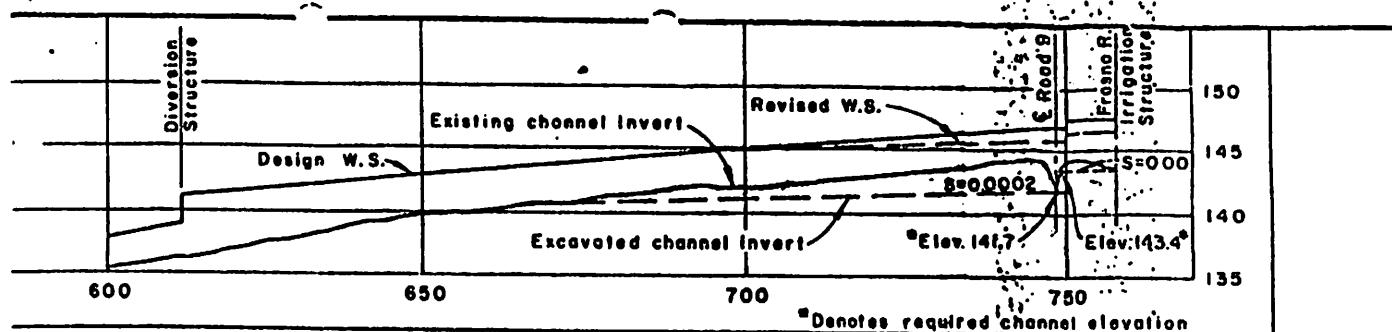
6' x 4' x 80'
 R.C. BOX
 WITH 6' x 4'

Side Gate

Invert of F.T. Fresno River
 Irrig. Structure Approach
 Ditch - ELEV. = 143.9

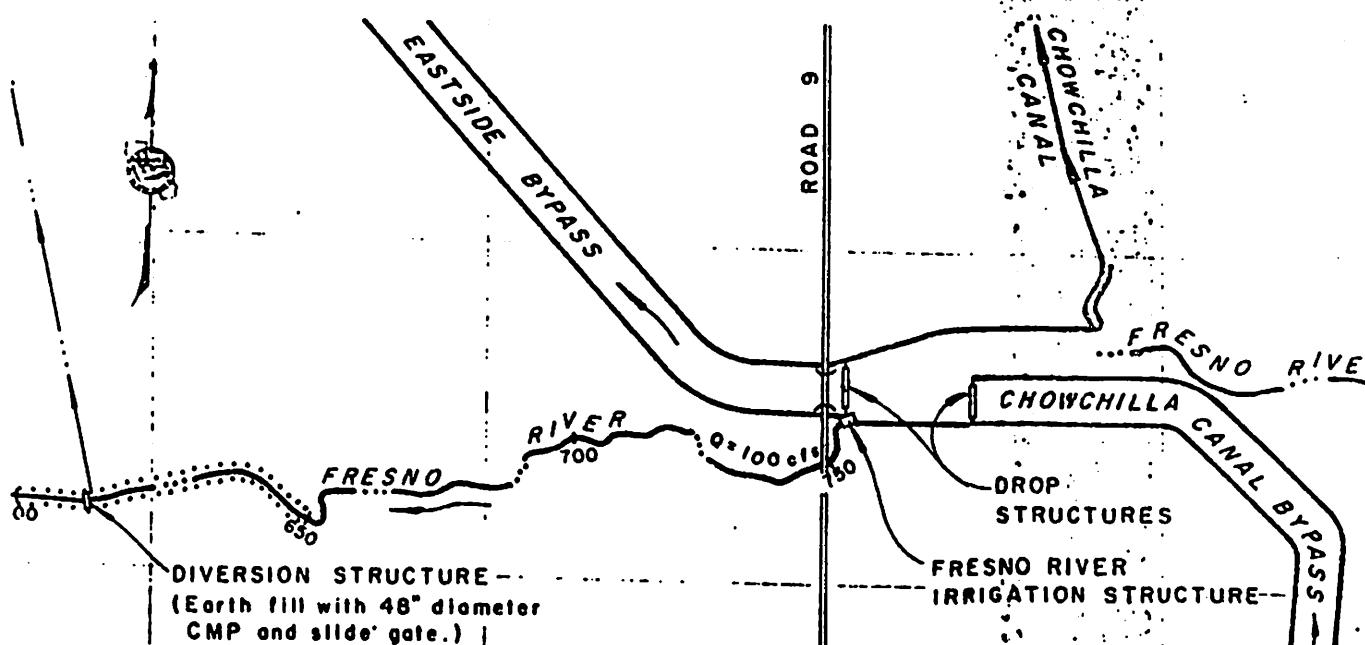
INVERT
 ELEV.
 = 143.9

○ Denotes measured E.S.B.P. from



PROFILE

Scale: Horiz. 1" = 2000'
Vertical 1" = 10'

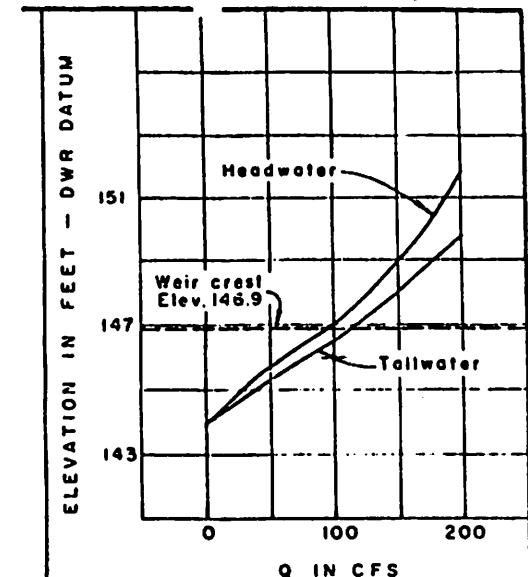


PLAN

Scale: 1" = 2000'

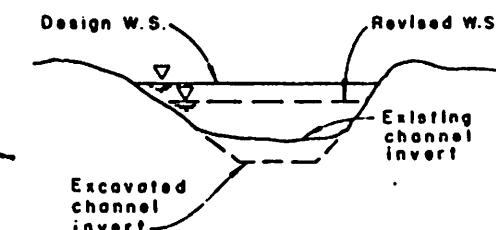
E. KUETEMEYER, 4-5-68

Fig. IX-3



RATING CURVE

Fresno River Irrigation Structure



TYPICAL SECTION

Sta. 664+00 to Sta. 748+00
No scale

LOWER SAN JOAQUIN RIVER FLOOD CONTROL PROJECT

FRESNO RIVER
PROPOSED CHANNEL EXCAVATION

Notes: Kesterson Triangle - 1 Month

Date: 6/9/78 @ 9:00 A.M.

Location: Outlet of Fresno River from
San Joaquin By-Pass @ Road 9

Present: Jim Wickersham \checkmark

Bill Findlater \checkmark

Bill McGlasson (McGlasson & Associates ?)

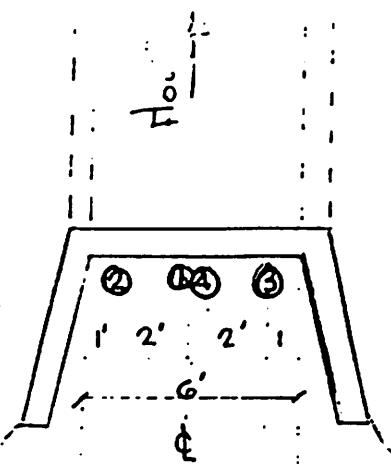
Tom McGuire M.I.D.

Jim Van Buren M.I.D.

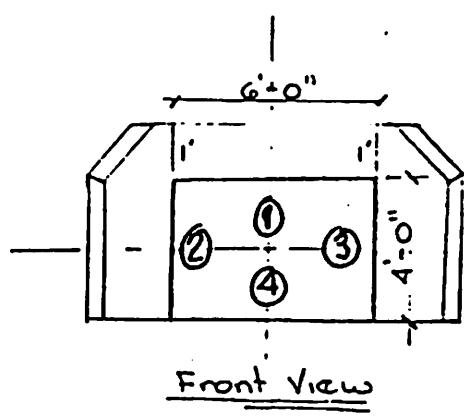
Frank Dix M.I.D.

- Elevation shot: Elevation of weir, inlet structure, outlet structure, road crossing, and water surfaces. The shots to the bench mark near the weir and near the outlet structure indicate a error of 0.36' in channel elevation. (i.e. the bench mark may have been established earlier and this would be consistent with settlement known to exist in the area)
- The attached current meter measurements ($Q = 80.03$) were taken approximately 50' downstream from the outlet structure. Subsequent examination of the control gate found that it was not fully open (only 20'-25') and had only reached one section where it was difficult to ...

3. The control gate was subsequently opened to where the indicator on the stem showed 49". The gate was difficult to open. (25 turns on the crank to the inch and most of the time 2 men on the crank required.)
4. With the gate now fully open an increase in flow was noticed and Jim Van Buren decided to take one more current measurement.
5. Jim attempted a measurement downstream and in two locations upstream and was unable to complete measurements as the stream was too deep.
6. Jim Van Buren then attempted a measurement at the outlet structure, this was abandoned as the velocities were to high to hold the motor in position.
7. Jim then took four sample velocities at the inlet structure. Following is a sketch of the structure and location of the measurements.



Top View



Front View

flow

measurement # 1 = 4.04 Average = 3.98
 # 2 = 4.04
 # 3 = 3.95
 # 4 = 3.87

$$3.98 \times 24^2 = 95.4 \text{ C.F.S.}$$

E. The difference in upstream to downstream water surface during the measurement was 0.56'

$$Q = 0.61 A \sqrt{2gH} \quad Q = 0.61 (24) \sqrt{64.4 (0.56)} = 87.92 \text{ C.F.S.}$$

Note: Coefficient of 0.61 is for standard submerged orifice. Coefficient should probably be higher if bottom contraction is suppressed. The recommended coefficient would be 0.70 and the Q would be 100.59 C.F.S. There is an opening ^{also} in the structure at the control gate, which would cause a partial loss in velocity head.

* reference: Water Measurement Manual, 2nd Ed

9. The inlet and outlet of the culvert crossing Road 9 was covered with water and was not accessable for measurement at this time.

10. Pictures were taken of the weir, inlet and outlet, inlet channel and outlet channel, and the Fresno River at Road 9. They will be included in the ∇ folder when developed.

11. Bill McGlasson requested copies of the current measurement and field book.

1st I X-4/s-
measurement

MADERA IRRIGATION DISTRICT

CURRENT METER NOTES

Date 6-9, 1978 9:30 a.m. Stream Fresno River
P.M. Party John Susan Locality Rd 9 + River
 Meter No. 6222 Gage height, beg. —, end —, mean —
 Total area — Mean velocity — Discharge —

DIST. FROM INITIAL POINT	DEPTH	DEPTH OF OD. SERVAT	TIME IN SEC ONDS	REV. OLU. TIONS	VELOCITY			MEAN DEPTH	WIDTH	AREA	DISCHARGE
					AT POINT	MEAN IN VERTI CAL	MEAN IN SEC. TION				
<u>30.0</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>				<u>15</u>	<u>2.0</u>	<u>.50</u>	<u>—</u>
<u>5.0</u>	<u>.50</u>	<u>—</u>	<u>—</u>	<u>—</u>				<u>.40</u>	<u>.75</u>	<u>1.0</u>	<u>.75</u>
<u>6.0</u>	<u>100</u>	<u>57</u>	<u>20</u>	<u>.80</u>				<u>.91</u>	<u>1.25</u>	<u>1.0</u>	<u>1.25</u>
<u>7.0</u>	<u>1.50</u>	<u>45</u>	<u>20</u>	<u>1.01</u>				<u>104</u>	<u>1.85</u>	<u>1.0</u>	<u>185</u>
<u>8.0</u>	<u>220</u>	<u>42</u>	<u>20</u>	<u>1.01</u>				<u>118</u>	<u>225</u>	<u>1.0</u>	<u>225</u>
<u>9.0</u>	<u>250</u>	<u>52</u>	<u>30</u>	<u>1.29</u>				<u>131</u>	<u>275</u>	<u>1.0</u>	<u>275</u>
<u>10.0</u>	<u>300</u>	<u>51</u>	<u>30</u>	<u>1.32</u>				<u>132</u>	<u>310</u>	<u>1.0</u>	<u>310</u>
<u>11.0</u>	<u>3.20</u>	<u>51</u>	<u>30</u>	<u>1.32</u>				<u>133</u>	<u>320</u>	<u>1.0</u>	<u>320</u>
<u>12.0</u>	<u>3.20</u>	<u>50</u>	<u>30</u>	<u>1.35</u>				<u>139</u>	<u>320</u>	<u>1.0</u>	<u>320</u>
<u>13.0</u>	<u>3.20</u>	<u>47</u>	<u>30</u>	<u>1.44</u>				<u>147</u>	<u>320</u>	<u>1.0</u>	<u>320</u>
<u>14.0</u>	<u>3.20</u>	<u>45</u>	<u>30</u>	<u>1.50</u>				<u>159</u>	<u>325</u>	<u>1.0</u>	<u>325</u>
<u>15.0</u>	<u>3.30</u>	<u>40</u>	<u>32</u>	<u>1.68</u>				<u>118</u>	<u>330</u>	<u>1.0</u>	<u>330</u>

No. — of — SHEETS. COMP. BY — CHK. BY —
 (MAKE NOTES ON BACK)

MADERA IRRIGATION DISTRICT

CURRENT METER NOTES

Date 6-9, 1978 9:20 A.M. Stream 55510 Kieler
 Party John Buren Locality Rd 9 - River
 Meter No. 622 Gage height, beg. —, end —, mean —
 Total area — Mean velocity — Discharge —

DIST. FROM INITIAL POINT	DEPTH	DEPTH OF OB- SERVAT	TIME IN SEC ONDS	REV. OLU- TIONS	VELOCITY			MEAN DEPTH	WIDTH	AREA	DISCHARGE	
					AT POINT	MEAN IN VER- TICAL	MEAN IN SEC- TION					
16.0	330		40	30	168			160	330	1.0	330	5.48
17.0	330		41	30	164			160	335	1.0	335	5.49
18.0	310		40	30	164			162	335	1.0	335	5.43
19.0	330		42	30	160			160	340	1.0	340	5.44
20.0	350		42	30	160			157	345	1.0	345	5.42
21.0	310		44	30	153			152	295	1.0	295	4.48
22.0	250		45	30	150			145	240	1.0	240	3.48
23.0	230		40	25	140			133	215	1.0	215	2.86
24.0	200		45	25	126			120	155	1.0	155	1.86
25.0	110		40	20	113			108	95	1.0	95	1.03
26.0	80		44	20	103			80	75	1.0	75	.60
27.0	70		41	10	57			57	45	1.0	45	.37

NO. — OF — SHEETS. COMP. BY — CHK. BY —
 (MAKE NOTES ON BACK)

MADERA IRRIGATION DISTRICT

CURRENT METER NOTES

Date 6-7, 1978, 9:30 AM P. M. Stream Fresno River
Party Van Susteren Locality 189 - River
Meter No. 2022 Gage height, beg. —, end —, mean —
Total area — Mean velocity — Discharge —

NO. _____ OF _____ SHEETS. COMP. BY _____ CHK. BY _____
(MAKE NOTES ON BACK)

Triangle
Using
0

T

1¹¹ 2

for Elav

Sta

B.S.

H1

FS

Elev

BM[#] 2

4⁰⁷

163⁴¹

158⁴⁴

157⁷⁶

157⁴⁰

BM[#] 1

5.65

5⁵⁶

11¹¹

14⁶¹

13³⁷

14⁶⁷

13²⁵

16⁵⁰

9³⁹

8¹¹

8⁷⁵

157⁸⁵

147³⁰

148⁸⁰

150⁰⁴

148⁷⁴

150¹⁶

146⁹¹

154⁰²

146⁷⁴

146¹⁰

148¹⁹

148²³

Top weir

Spill lip

W.S. @ weir

W.S. inlet D.D. 9

W.S. outlet D.D. 2

W.S. @ Inlet Str. - 1.25 }
W.S. @ Outlet Str. - 1.93 } during
2nd measurement

6/4/14

(5.1)

However, on June 9, 1978, there was substantial flow over the weir. The survey notes indicate a weir crest elevation of 146.94 feet and water surface level of 148.44 feet. From the DWR rating curve (Fig. IX-2) the weir discharge was about 700 cfs. With Hidden Dam releases varying from 88 cfs to 147 cfs in the June 2-8 period (U.S.G.S. record) it is certain all such releases would have been absorbed in diversions and channel losses upstream of the outlet structure and therefore the 700 cfs of overflow must have originated in the San Joaquin River-Chowchilla Bypass area. This is confirmed by DWR's Bulletin 130-78 data, pp. 18 and 22, which shows the following:

<u>Date</u>	<u>Below Friant</u>	<u>Mendota Gage</u>
June 6, 1978	4,980 cfs	1,216 cfs
7	4,980	914
8	4,570	752
9	3,840	755

P. 21 of Bull. 130-78 shows no Delta-Mendota Canal water being delivered to Mendota Pool June 1-22, 1978. Although something in excess of 2,300 cfs can be diverted by C.C.I.D., other Contracting Entities and others at and above Mendota Dam, these maximum diversions would not have been underway in early June of a 1978, leaving a substantial block of San Joaquin River water to enter the Chowchilla Bypass, thence over the E.S.B.P. weir.

Further measurements of discharge were made July 1, 2 and 3, 1980, at the Road 9 culvert. Results are shown in Mr. Robert's letter of July 10, 1980, to Mr. John B. Hardin of McGlasson & Associates, copy attached.

These data lack water surface elevations at the entrance to the outlet structure. Figure IX-2 indicates the water level at 100 cfs overflow of the E.S.B.P. weir to be about elevation 147.4 which would cause a discharge of about 76 cfs from the 1968 rating curve; although this roughly checks the measured flows of July 1

MADERA
IRRIGATION
DISTRICT

12152 ROAD 28½

MADERA, CA 93637 July 10, 1980

(209) 673-3514

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Mr. John B. Hardin
McGlasson & Associates
Post Office Box 4436
Fresno, California 93744

Re: Triangle T - Fresno River

Dear Mr. Hardin:

On July 3, 1980 we made measurement of the flow being diverted by Triangle T at Road 9. You and representatives of Triangle T were present.

At the time of the measurement a substantial quantity of water was flowing in the main channel section past the weir at Road 9. We contacted the Water and Power Resources Service and were advised that they were diverting 1590 cfs to this channel.

As we advised you at the July 3rd meeting, we had made measurements at the Triangle T diversion on July 1st and 2nd when the flow in the River was limited to the 100 cfs range and was just spilling over the Avenue 9 weir in the river channel.

A summary of the measurements for all three days is noted on the following page.

Mr. John B. Hardin
Re: Triangle T - Fresno River

July 10, 1980
page 2

<u>Date</u>	<u>Fresno River Flow - cfs</u>				<u>Triangle T Diversion</u>			
	<u>Rd. 19</u>	<u>+</u>	<u>Dry Creek Spill</u>	<u>+</u>		<u>WPRS</u>	<u>=</u>	<u>Total</u>
<u>1980</u>								
7/1	104	+	17	+	0	=	121 "	81.6
7/2	98	+	14	+	0	=	112	73.6
7/3	100	+	14	+	1590	=	1704	108.0

A copy of the measurement data for the Triangle T diversion is attached for your information.

Please let me know if you have any questions on this matter.

Very truly yours,



Don Roberts
Civil Engineer

enclosures

cc/w enc.:

Triangle T Ranch, Inc.
✓Mr. A. N. Murray
Denslow Green, Esq.

MADERA IRRIGATION DISTRICT

CURRENT METER NOTES

Date 7-1, 1980, 12:32 A.M. Stream FRESNO RIVER
Party Van Buren Locality Road 9
Meter No. 622 Gage height, beg. —, end —, mean —
Total area 19.02 Mean velocity 4.29 Discharge 81.6

WATER GOING OVER CONCRETE
WEIR NORTH END

Pipe Size 6.0 feet wide
3.17 feet deep

MADERA IRRIGATION DISTRICT

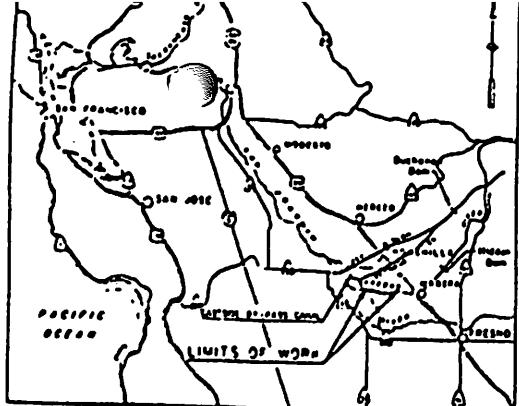
CURRENT METER NOTES

Date 7-2 1980 9:30 A.M. Stream FRESNO RIVER
Party VAN BUREN Locality ROAD 9
Meter No. 622 Gage height, beg. —, end —, mean —
Total area 18.6 Mean velocity 3.95 Discharge 73.2

MADERA IRRIGATION DISTRICT

CURRENT METER NOTES

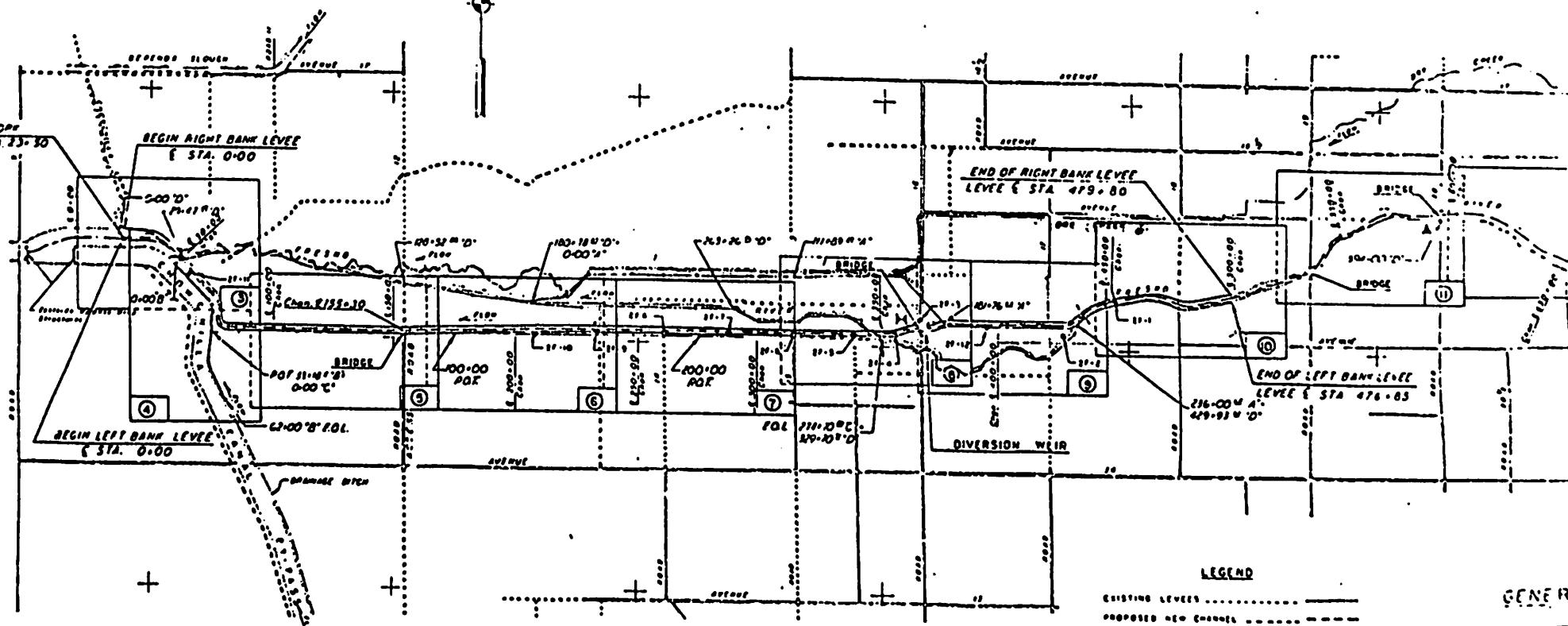
Date 7-3 1980 A. M. Stream FRESNO RIVER
P. M.
Party Van Buren Locality Road 9
Meter No. 622 Gage height, beg. —, end —, mean —
Total area 24.0 Mean velocity 4.50 Discharge 108.02



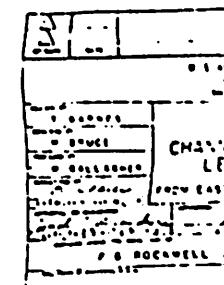
LOCALITY MAP

SCALE 10 MILES

0 10 20 30 40 50



PLAN
SCALE: 1 IN. = 2000 FT.
GRAPHIC SCALE



and 2, the results probably aren't too credible since both curves may not fit present day conditions. The July 3 measurement of 108 cfs is well under the Figure IX-2 results for 1,700 cfs over the weir; this may be due to substantially less than 1,700 cfs being at the weir -- note WPRS says "that they were diverting 1,590 cfs to this channel" (i.e., Chowchilla By-pass at San Joaquin River).

It seems reasonable to assume from all these data that the 1968 estimated outlet capacity of 60 cfs (water at the weir crest) exists today and that the 100 cfs design capacity (water at the weir crest) could be restored by excavating the channel between the outlet and the Road 9 culverts and downstream thereof for several thousand feet. This study so assumes.

X. REACH DEMANDS

X. Reach demands

Triangle T's acreages of each crop are the totals of each as shown in the crop map of Section VII. The crop map was compared with aerial photos to develop the estimated acreage of each crop in each section of riparian land; these estimates are shown in Table X-1 for the Triangle T maximum riparian area and are carried into Table X-2 which reflects maximum Sallaberry and Triangle T acreage.

The attached Table X-2 shows, by reaches, parcel numbers, owner's names, riparian acres, crops, net irrigated acres (taken as 95% of cropped acres to allow for ditches, roads, fences and turn-arounds), and monthly demand in AF based on Bulletin 113-1 data described in Section VIII. Triangle T and Sallaberry maximum riparian acreages are reflected in Table X-2

Monthly demands by reach are totalled and converted to average cfs.

Although there are a number of river pumps in Reach 3 (Head-of-Island to Franchi Dam) most of the riparian parcels in this reach are served by M.I.D. facilities.

Riparians within M.I.D. in Reach 5 that are serviceable from Franchi Dam via the M.C. and I. system are indicated.

Averill, Glantz and Sallaberry all can divert above the weir at Road 16 (end of Reach 5) and accordingly are shown as diverting in that reach.

Table X-2 considers Sallaberry's demand to be for maximum riparian acreage of 2,896 A and the corresponding appropriative acreage to be 480 A.

Table X-2 also is based on Triangle T's maximum riparian acreage (including Secs. 21, 22 and 23) of 2,873 A.

The acreages of riparian land by crop for Triangle T minimum (without Secs. 21, 22 and 23) are shown in Table X-3 as is Sallaberry's minimum riparian area of 1,830 acres and corresponding non-overlapping appropriative area of 1,301 acres.

As discussed in Section XIII, the non-overlapping Triangle T appropriative water demand and yield is derived from the computer studies rather than being reflected in them.

Table X-1
Triangle T Crops and Water Requirements

<u>Crop</u>	<u>Sec- tion</u>	<u>Area (Acres)</u>	<u>Net Area (95%) (Acres)</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Remarks</u>	
Native Pasture	7	160															Pump ?
	8	122															Pump ?
	14	168															Wild flood ?
	15	390															Wild flood ?
	21	113															Wild flood ?
	22	286															Wild flood ?
	23	<u>160</u>															Wild flood ?
Total Native		1,399	1,329	AF cfs	997 59.1	997 59.3	997 55.3	997 53.3	--	--	--	--	--	997 55.6	997 60.0	997 60.0	Maximum = 3/4 AF/A in any 30-day period
Cotton	8	34															Pump ?
	14	64															Gravity or pump ?
	15	85															Gravity or pump ?
	16	107															Pump or gravity ?
	17	<u>56</u>														Pump ?	
Total Cotton		346	329	AF cfs	--	--	--	--	33 0.5	188 3.2	388 6.3	352 5.7	224 3.8	99 1.6	--	--	
Barley	8	30															Pump ?
	16	246															Pump or gravity ?
	21	<u>25</u>															Gravity or pump ?
Total Barley		301	286	AF cfs	9 0.1	37 0.7	94 1.5	114 1.9	100 1.6	46 0.8	--	--	--	--	--	--	
Alfalfa	8	74															Pump ?
	15	141															Pump or gravity ?
	16	179															Pump ?
	17	167															Pump ?
	21	42															Gravity or pump ?
	22	<u>31</u>															Gravity or pump ?
Total Alfalfa		634	602	AF cfs	--	--	199 3.2	283 4.8	409 6.7	482 8.1	524 8.5	470 7.6	343 5.8	175 2.8	--	--	
Channels	8	26															
	14	8															
	15	24															
	16	25															
	17	15															
	21	2															
	22	<u>3</u>															
Total Channels		103	98	AF cfs	60	60	60	60	9	12	15	12	10	60	60	Subject to 30-day limit on native pasture	
GRAND TOTAL		2,783	2,644	AF	1,006	1,034	1,290	1,394	542	716	912	822	567	1,271	997	997	

FRESNO RIVER RIPARIAN DEMAND

Reach 1 = Hidden Data to Workers

• 95% of Gross Irr. Acres.

ENB REACH 2 - BEGIN REACH 3

Table X-2
FRESNO RIVER RIPARIAN DEMAND

Reach 3 - "Head of Island" to Franchi Dam																		
Name	Par. No.	Riparian Acres	Gross Irrig. Acres	Crop	Net Irrig. Acres*	J	F	M	A	M	J	J	A	S	O	N	D	Remarks
Smith	26	49.0	49.0	Milo	47	0	0	0	0	0	15	55	42	15	0	0	0	166.0 A riparian in MID -- Island Service?
		20.0	20.0	Pasture	19	0	0	8	11	16	18	19	16	12	8	0	0	
		45.0	45.0	Alfalfa	43	0	0	14	20	29	34	37	34	25	12	0	0	
		266.32	0	Native	0	0	0	0	0	0	0	0	0	0	0	0	0	
		37.0	0	River	0	0	0	0	0	0	0	0	0	0	0	0	0	
		8.14	0	31F ?	0	0	0	0	0	0	0	0	0	0	0	0	0	
Smith	31	39.48	0	River/native	0	0	0	0	0	0	0	0	0	0	0	0	0	
State of CA	32	110.0	0	River/native	0	0	0	0	0	0	0	0	0	0	0	0	0	
Smith	33	15.0	0	River/native	0	0	0	0	0	0	0	0	0	0	0	0	0	
Smith	34	41.0	41.0	Pasture	39	0	0	16	23	33	38	39	33	24	16	0	0	144.0 A riparian in MID -- Island Service?
		57.0	57.0	Alfalfa	54	0	0	18	25	37	43	47	42	31	16	0	0	
		42.3	0	River	0	0	0	0	0	0	0	0	0	0	0	0	0	
		3.42	0	Road	0	0	0	0	0	0	0	0	0	0	0	0	0	
		75.58	0	Native	0	0	0	0	0	0	0	0	0	0	0	0	0	
Doig	36	48.5	48.5	Pasture	46	0	0	19	27	39	45	46	39	29	19	0	0	Elliott 10/7/77 memo;
		113.0	113.0	Barley	107	3	14	35	43	37	17	0	0	0	0	0	5 HP pump 2.27 cfs	
		91.0	91.0	Corn	86	0	0	0	0	0	52	107	80	36	0	0	10 HP pump 3.29 cfs	
		29.3	0	River	0	0	0	0	0	0	0	0	0	0	0	0		
		4.64	0	Road	0	0	0	0	0	0	0	0	0	0	0	0		
		21.36	0	Native	0	0	0	0	0	0	0	0	0	0	0	0		
Stoetzl	37	56.0	56.0	Pasture	53	0	0	22	31	45	51	54	45	33	22	0	0	Elliott 10/7/77 memo;
		30.25	0	Riv/rd/nat.	0	0	0	0	0	0	0	0	0	0	0	0	15 HP pump 2.38 cfs	
Stoetzl	39	3.0	3.0	Pasture	3	0	0	1	2	3	3	3	3	2	1	0	0	Assume irrig. w/Parcel 37
		2	0	Equip. yd.	0	0	0	0	0	0	0	0	0	0	0	0		
		4.55	0	River	0	0	0	0	0	0	0	0	0	0	0	0		
State of CA	40	136.7	0 ?	Lake Madera	0 ?	0	0	0	0	0	0	0	0	0	0	0	0	
		26.25	0	River	0	0	0	0	0	0	0	0	0	0	0	0		
		281.82	0	Native	0	0	0	0	0	0	0	0	0	0	0	0		
				TOTAL FWD		3	14	133	182	239	316	407	334	207	94	0	0	

* 95% of Gross Irr. Acres.

Name	No.	Riparian Acres	Gross Irrig. Acres	Crop	Net Irrig. Acres	J	E	M	A	M	J	J	S	O	N	D	Remarks		
Stoeckl	42	120.0	120.0	Alfalfa	124	0	0	38	54	78	91	99	89	65	33	0	0	B110ote 10/7/77 memo; 15 HP.	
Stoeckl	43	91.73	91.73	Alfalfa	87	0	0	0	0	0	0	0	0	0	0	0	0	0	Island lateral
Oyler	44	67.0	67.0	Pasture	64	0	0	0	26	37	54	62	65	40	28	0	0	0	Island lateral
Stoeckl	45	21.41	8.0	Pasture	8	0	0	0	3	0	5	7	8	8	5	3	0	0	Island lateral
Stoeckl	46	13.5	5.92	23.5	0	0	0	0	0	0	0	0	0	0	8	6	0	0	1/ Idle in 1978; pasture assumed; 10/7/77 B110ote memo; 7HP pump, 2.27 CFS
Martlin	47	1.80	1.59	1.8	2	0	0	0	1	2	2	2	0	0	1	1	0	0	Island lateral
Wabbenhorst	48	33.75	40.96	33.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Island lateral
Stoeckl	49	11.1	11.1	Pasture	11	0	0	0	0	0	0	0	0	0	0	0	0	0	Island lateral
Dennies	50	1.59	1.59	0	0	0	0	1	1	2	2	2	0	0	1	1	0	0	Island lateral
Wabbenhorst	51	27.83	40.54	40.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Island lateral service
Wooley	52	7.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Non-tirr. gr.
Wabbenhorst	53	33.75	40.96	33.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Island lateral
Stoeckl	54	3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Rd/ress/nat.
Wooley	55	152.8	152.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Rd/ress/nat.
Glantes	56	4.70	48.54	48.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Pasture
Cassie	57	51.73	51.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	River
Glantes	58	48.54	48.54	48.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Pasture
Cassie	59	51.73	51.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	River

Reach 3 CONT'D - Head of Island to French Dam

FRESNO RIVER RIPARIAN DEMAND

Table X-2

Table X-2
PRESNO RIVER RIPARIAN DEMAND

Reach 3 CONT'D - "Head of Island" to Franchi Dam

Name FWD	Par. No.	Riparian Acres	Gross Irrig. Acres	Crop	Net Irrig. Acres*	Reach 3												Remarks
						J	F	M	A	M	J	J	A	S	O	N	D	
					3	14	302	422	587	719	829	695	471	265	0	0		
Dennis	61	39.87 9.00 8.23	39.87 9.00 0	Barley Pasture Other	38 9 0	1 0 0	5 0 0	13 4 0	15 5 0	13 8 0	6 9 0	0 9 0	0 8 0	0 6 0	0 4 0	0 0 0	Elliott 10/7/77 memo; 10-12' lift; no pump/motor; deep well; island lateral serv.	
Doig	64	1.34 1.2	1.34 0	Pasture Resid.	1 0	0 0	0 0	0 0	1 0	1 0	1 0	1 0	1 0	1 0	0 0	0 0	0	Island lateral service
Doig	65	50.63 1.27	50.63 0	Pasture Other	48 0	0 0	0 0	20 0	28 0	40 0	47 0	48 0	41 0	30 0	21 0	0 0	0	Island lateral service
Terance	82	1.28 0.77	1.28 0	Pasture River	1 0	0 0	0 0	0 0	1 0	1 0	1 0	1 0	1 0	1 0	0 0	0 0	0	Island lateral service
Lomer	91	54.67 20.22	54.67 0	Vines Riv/road	52 0	0 0	0 0	0 0	5 0	24 0	37 0	43 0	35 0	22 0	9 0	0 0	0	Island lateral service
Huntley	100	56.1 17.6	56.1 0	Pasture Other	53 0	0 0	0 0	22 0	31 0	45 0	51 0	54 0	45 0	33 0	23 0	0 0	0	Elliott 10/7/77 memo; 1.96 cfs pump. Island lateral service
Evans	101	49.46 4.4	49.46 0	Pasture Other	47 0	0 0	0 0	19 0	27 0	39 0	46 0	47 0	40 0	29 0	20 0	0 0	0	Island lateral service
Green	103	16.48	16.48	Pasture	16	0	0	7	9	13	16	16	13	10	7	0	0	Island lateral
James	104	10.83	0	Res/rd/nat.	0	0	0	0	0	0	0	0	0	0	0	0	0	
Huntley	105	9.61	9.61	Pasture	9	0	0	4	5	8	9	9	8	6	4	0	0	Island lateral
				TOTAL FWD		4	19	391	549	779	942	1,057	887	609	353	0	0	

* 95% of Gross Irr. Acres.

Table X-2
FRESNO RIVER RIPARIAN DEMAND

Reach 3 CONT'D - "Head of Island" to Franchi Dam

Name	Par. No.	Riparian Acres	Gross Irrig. Acres	Crop	Net Irrig. Acres*	Reach 3 CONT'D - "Head of Island" to Franchi Dam												Remarks
						J	F	M	A	M	J	J	A	S	O	N	D	
FWD						4	19	391	549	779	942	1,057	887	609	353	0	0	
Huntley	106	132.3	105.3	Pasture Riv/rd/nat.	100 0	0 0	0 0	41 0	58 0	84 0	97 0	101 0	85 0	62 0	43 0	0 0	0 0	Island lateral
				Total Reach 3 - AF	4	19	432	607	863	1,039	1,158	972	671	671	396	0	0	
				Mean cfs	0	0	7.03	10.20	14.04	17.46	18.83	15.81	11.28	11.28	6.44	0	0	

END REACH 3 - BEGIN REACH 4, MID ADJUDICATED DIVERSION

Reach 4 - MID Main Canal at Franchi Dam

END REACH 4 - BEGIN REACH 5

Reach 5 - Franchi Dam to Road 16 - Service via MC&I system only

Westgate	116	29.46	0	Wheat	0	0	0	0	0	0	0	0	0	0	0	0	0	Assumed dry farmed ?, MC&I
Westgate	117	111 40.17	111 0	Corn Other	105 0	0	0	0	0	0	64	130	98	44	0	0	0	MC&I
Mosesian	118	60 9.02	60 0	Vines Other	57 0	0	0	0	5	27	41	47	39	25	7	0	0	MC&I
Mosesian	119	80 117 103.82	80 117 0	Vines Barley Riv/canal	76 111 0	0	0	0	7	36	55	63	52	33	9	0	0	MC&I
Kirkman	141	98 37.08 26	98 37.08 0	Orchard Barley River	93 35 0	0	0	16	28	46	58	64	55	25	15	0	0	MC&I, Almonds assumed
				TOTAL FWD	4	18	65	98	160	242	304	244	127	31	0	0		

* 95% of Gross Irr. Acres.

Table X-2
PRESNO RIVER RIPARIAN DEMAND

Reach 5 CONT'D - Franchi Dam to Road 16

Name FWD	Par. No.	Riparian Acres	Gross Irrig. Acres	Crop	Net Irrig. Acres*	Reach 5 CONT'D - Franchi Dam to Road 16													
						J	F	M	A	M	J	J	A	S	O	N	D	Remarks	
					4	18	65	98	160	242	304	244	127	31	0	0			
Moseesian	142	133.99	133.99	Vines	127	0	0	0	11	60	91	105	86	55	22	0	0	MC&I	
		77	77	Barley	73	2	9	24	29	26	12	0	0	0	0	0	0		
		105	105	Orchard	100	0	0	17	30	49	62	69	59	27	16	0	0	Almonds assumed	
		22.48	0	Riv/canal	0	0	0	0	0	0	0	0	0	0	0	0	0		
P.R. Farms	143	105	105	Orchard	100	0	0	0	17	30	49	62	69	59	27	16	0	0	MC&I; almonds assumed
		12.48	0	River	0	0	0	0	0	0	0	0	0	0	0	0	0		
Elgarriaga	144	9	9	Barley	9	0	1	3	4	3	1	0	0	0	0	0	0	{MC&I; idle in survey--	
		8.73	0	Riv/canal	0	0	0	0	0	0	0	0	0	0	0	0	0	barley assumed	
P.R. Farms	148	63.68	63.68	Orchard	61	0	0	10	18	30	38	42	36	16	10	0	0	MC&I; almonds assumed	
		6.50	0	River	0	0	0	0	0	0	0	0	0	0	0	0	0		
Kirkman	150	44.68	44.68	Barley	42	1	5	14	17	15	7	0	0	0	0	0	0		
		63.32	63.32	Cotton	60	0	0	0	0	6	34	71	64	41	18	0	0		
		7.45	7.45	Pasture	7	0	0	3	4	6	7	7	6	4	3	0	0	MC&I	
Morimoto	152	97.84	97.84	Orchard	93	0	0	16	28	46	58	64	55	25	15	0	0	MC&I, almonds assumed	
		1.41	0	Canal	0	0	0	0	0	0	0	0	0	0	0	0	0		
Averill	193	29.67	29.67	Cotton	28	0	0	0	0	3	16	33	30	19	8	0	0		
		1.00	0	Road	0	0	0	0	0	0	0	0	0	0	0	0	0		
		TOTAL REACH 5 in MC&I - AF				7	33	169	269	453	630	764	639	341	139	0	0		
					cfs	0	0	3	5	7	11	12	10	6	2	0	0		
Averill	202	497.3	497.3	Cotton	472	0	0	80	142	231	293	326	278	127	76	0	0		
		60.0	60.0	Pasture	57	0	0	23	33	48	55	58	48	35	25	0	0		
		117.11	117.11	Alfalfa	111	0	0	37	52	75	89	97	87	63	32	0	0		
		9.18	0	Road/res.	0	0	0	0	0	0	0	0	0	0	0	0	0		
		TOTAL AVERILL in R-5 AF				0	0	140	227	354	437	481	413	225	133	0	0		
					cfs	0	0	2	4	6	7	8	7	4	2	0	0		
		TOTAL FWD				7	33	309	496	807	1,067	1,245	1,052	566	272	0	0		

* 95% of Gross Irr. Acres.

Table X-2
FRESNO RIVER DIAPHRAN DEMAND

NOTE

Reach 5 CONT'D - Franchi Dam to Road 16

Maximum Sallaberry Riparian and Triangle T

* 95% of Gross, except Sallaberry

** See Sallaberry memos; BLM acreage and parcels as shown on quad maps incorrect due limitation to separate 160-A patents.
*** Omits areas overlapping riparian acreage; otherwise, acreage in each section per Application date.

*** Omits areas overlapping riparian acreage; otherwise, acreage in each section per Application date.

Table X-3
MERCED RIVER RIPARIAN DEMAND

Name	Par. No.	Riparian Acres	Gross Irrig. Acres	Crop	Net Irrig. Acres*	Reach 5 CONT'D - Franchi Dam to Head 16												NOTE	Minimum Sallaberry Riparian and Triangle T
						J	F	M	A	M	J	J	A	S	O	N	D	Remarks	
FWD						7	33	309	496	807	1,067	1,245	1,052	566	372	0	0		
Glantz	220					0	0	115	163	265	442	641	578	393	187	0	0		
Sallaberry	** 1830	1830	Mat.-Irr.	1830	AF 1,372.5 cfs 500 500	500	500	500	500	500	500	No Flow	500	500	500	500	500	1,372.5	
	(** = Riparian)																		
	MAXIMUM TOTAL RIPARIAN Reach-5					AF 1,379	1,405	1,796	2,031	2,444	2,881	1,886	1,630	959	1,931	1,372	1,372		
	*** 1301	1301	Mat.Irr.	1301	AF 976 cfs 45 45	976	976	976	976	976	976	976	976	976	976	976	976		
	(*** = appropriative)																		
Triangle T	240	346	346	Cotton	329 AF 0 0	0	0	0	33	187	389	352	224	99	0	0	0		
		276	276	Barley	262 AF 0 34	0	34	06	105	92	42	0	0	0	0	0	0		
		561	561	Alfalfa	533 AF 0 0	0	0	176	251	362	426	464	416	304	155	0	0		
		840	840	Native	798 AF 599 599	599	599	598	599	598	599	599	598	599	598	599	599		
		98	98	Channels	0 0 0 0	0	0	0	00	0	0	0	0	0	0	0	0		
	TOTAL MINIMUM (crop land)					AF 8 cfs 0.13	34 0.61	262 4.26	356 5.98	487 7.92	655 11.01	853 13.07	768 12.49	528 8.87	254 4.13	0 0	0 0		
	TOTAL MAXIMUM					AF 606 cfs 60	633 60	860 60	955 60	1,085 60	1,254 60	1,451 60	1,367 60	1,126 60	853 60	598 60	599 60		

* 95% of Gross, except Sallaberry

XI. BASIS FOR COMPUTER PROGRAMS

XI. Basis for computer programs

Attached are the following:

- (1) Table XI-1 and Column Explanation
"Distributing imported and natural flow Fresno River water."
- (2) Table XI-2. "Summary of monthly demands by reach."
- (3) Table XI-3. "Reach losses." (from Section II)

The study is based on the period Oct. 1, 1960-Sept. 30, 1972, and utilizes recorded and/or estimated daily flows at the following gages:

- (a) Fresno River near Daulton
- (b) Big Creek Diversion near Fish Camp
- (c) Soquel Diversion near Sugar Pine
- (d) North Fork Willow Creek near Sugar Pine. (Flows assumed Oct. 1, 1961-Aug. 6, 1965).

Table XI-1 is divided into 8 sections as follows:

- A. Developing historical natural flow at Hidden.
- B. Developing future (under M.I.D.-P.G.E. contract) imported, natural and total flow at Hidden.
- C. Apportioning future Hidden inflow and Madera Canal imports among Reach 1, 2 and 3 import and natural flow losses and apportioning natural flow after losses, by reach, to riparians above Franchi Dam.

- D. Developing M.I.D. diversions at Franchi Dam of Big Creek imports, Hidden natural flow under M.I.D.'s adjudicated 200 cfs right as adjusted by Soquel by-pass, and Madera Canal imports.

E. Developing losses, riparian demand and riparian diversions in Reach 5 (Franchi Dam to Road 16 weir).

F. Developing losses, riparian demand and riparian diversions in Reach 6 (Road 16 weir to Triangle T ranch).

G. Developing diversions under Triangle T (3/9/45), Sallaberry (1/13/50) and M.I.D. (4/10/53) appropriative rights under Applications 11003, 13541 and 15287.

H. Developing M.I.D. total diversions at Franchi Dam and flows to East Side Bypass, i.e., not used under any right.

Table XI-1 presents a variety of fictitious natural and imported flow situations using reach losses from Table XI-3 and April/May reach riparian demands from Table XI-2. Demands will vary monthly, of course. Also, we will want the computer program to reflect future developments (such as growth or reduction in reach demand from those being used). We look forward also to using M.I.D.'s computer as an operational tool in which current Big Creek, Soquel and Hidden inflow data and Madera Canal import will enable daily yields of rights to be calculated. For this reason, Table XI-1 includes Madera Canal examples.

Final computer studies depart from Table XI-1 and the column explanation in only two respects. Following an initial computer run in accordance with Table XI-1, comparison of daily Daulton recorded flows with recorded Soquel and Big Creek diversions revealed many days when negative natural flows existed. There being no measurements available of losses or accretions between either of the two diversions and the Daulton gage, the 1961-72 records were compared to estimate a loss figure that would eliminate the indicated negative natural flows at Hidden. Use of a 4 cfs loss value for each diversion appeared most reasonable and was applied to both imports in the final computer studies although Table XI-1 does not reflect such losses.

Table XI-1 also has a column to reflect Triangle T's appropriations under Application 11003. It appearing that this right seldom yielded any useful water (having in mind the extent of overlapping of riparian and appropriative places of use), this factor was eliminated in the final computer studies. However, as discussed in Section XIII, an analysis was made of one computer study to measure the yield of this right and the effect of recognizing it on the yields of the appropriative rights of Sallaberry (Application 13541) and M.I.D. (Application 15287).

Table 81-1
Kept 1 of 3

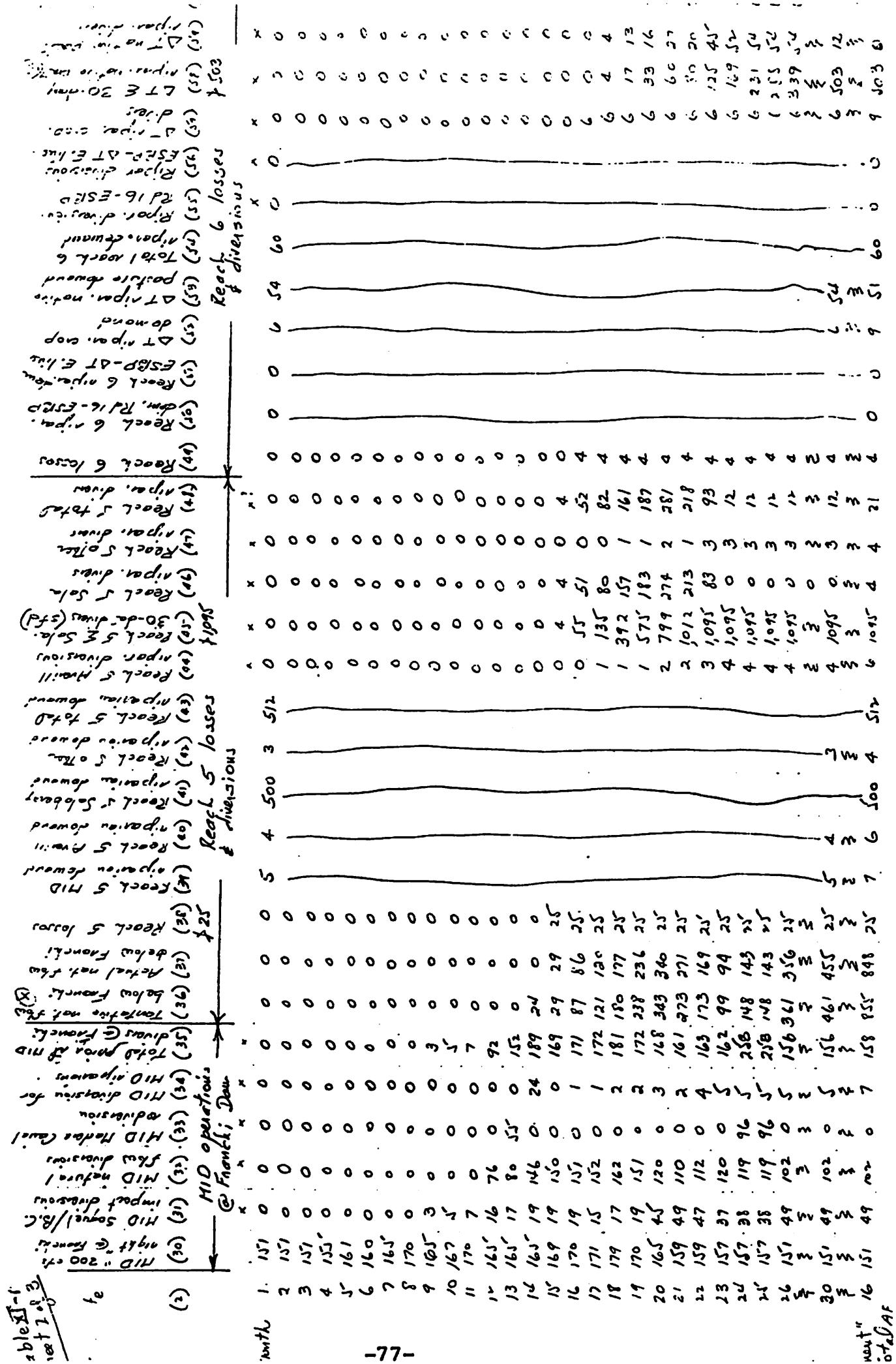


Table XI-1
Sheet 3 of 3

Column Explanation

Table I distributing imported and natural Fresno River flow

(1) (2) Month and date

A. To develop (8), historical natural flow at Hidden Dam.

(3) Flow recorded at Daulton gage.

An input value.

(4) Flow recorded at Big Creek diversion previous day and included in Daulton flow on indicated date. (One day travel time assumed to avoid situation where Big Creek plus Soquel on a date are greater than recorded at Daulton that day.)

An input value. See memo of 2/19/80 for missing record.

(5) Big Creek right.

An input value of:

50 cfs Oct. 1-Mar. 31

20 cfs Apr. 1-30

50 cfs May 1-July 15

0 cfs July 16-Sept. 30

(6) Flow recorded at Soquel diversion previous day and included in Daulton flow on indicated date. (Same travel time).

An input value. See memo of 2/19/80 for missing record.

(7) Historical import at Hidden Dam.

(7) = (4) + (6)

(8) Natural flow at Hidden Dam.

(8) = (3) - (7)

B. To develop (13), future total inflow to Hidden in accordance with MID-PGE contract.

(9) Recorded flow at gage North Fork Willow Creek near Sugar Pine.

An input value. See memo of 2/19/80 for missing record.

(10) Soquel right under PG and E contract.

(10) = $0.8 \times [(6) + (9)]$ but ≥ 50 cfs Oct. 1-July 31.

(10) = 1 cfs Aug. 1-Sept. 30

(11) Future by-pass of divertable water to Bass Lake.

(11) = (10) - 1 cfs Oct. 1-July 31

(11) = Zero Aug. 1-Sept. 30

(12) Total future import at Hidden

(12) = (10) - (11) + lesser of (4) or (5) Oct. 1-July 31

(12) = 1 cfs + lesser of (4) or (5) Aug. 1-Sept. 30

(13) Total future inflow at Hidden

(13) = (8) + (12)

C. To apportion total Hidden flow between Reach 1, 2 and 3 import and natural flow losses and to apportion remaining natural flow among riparians above Franchi Dam.

(14) Reach 1 total losses.

An input value of 11 cfs.

(15) Reach 1 import losses.

Proportional part of total Reach 1 losses (14) borne by import water (12) at Hidden.

(15) = $\frac{(12)}{(13)} \times (14)$, but when $(13) \leq (14)$, (15) = (12)

(16) Reach 1 natural flow losses.

Proportional part of total Reach 1 losses borne by natural flow at Hidden.

(16) = $\frac{(8)}{(13)} \times (14)$, but when $(13) \leq (14)$, (16) = (8)

(17) Reach 1 riparian demand.

An input value which varies from month to month and is subject to future development. Currently zero in all months.

(18) Reach 1 riparian diversions.

Currently zero. In the future a calculated value \leq (17) depending on available natural flow at Hidden. See apportionment process under (24) and (29) below.

(19) Madera Canal deliveries to Fresno River at head of Reach 2.

An input value currently assumed at zero. (Example values are shown for dates of 13th, 24th and 25th in table.)

(20) Reach 2 total losses.

An input value of 4 cfs.

(21) Reach 2 import losses.

Proportional part of total Reach 2 losses (20) borne by import water available at head of Reach 2 $[(12)-(15)]$.

(21) = $\frac{(12)-(15)}{(12)-(15)+(8)-(16)} \times (20)$, but, when Madera Canal deliveries (19) are being made

$$(21) = \frac{(12)-(15)+(19)}{(12)-(15)+(19)+(8)-(16)} \times (20)$$

(22) Reach 2 natural flow losses.

Proportional part of total Reach 2 losses (20) borne by natural flow available at head of Reach 2.

$$(22) = (20) - (21)$$

(23) Reach 2 riparian demand

An input value which varies from month to month and is subject to future development.

(24) Reach 2 riparian diversions.

(24) = Zero when $(8) \leq (16)+(22)$

(24) = (23) when $(8) \geq (16)+(17)+(22)+(23)+(27)+(28)$

= $\frac{(23)}{(16)+(22)}$ when $(8) > (16)+(22)$ but $< (16)+(17)+(22)+(23)+(27)+(28)$
and available natural flow at Hidden must be apportioned between (17) and (23)

and

= $\frac{(23)}{(16)+(18)+(24)}$ when $(8) > (16)+(18)+(24)$ but $< (16)+(18)+(24)+(28)$
when available natural flow at the head of Reach 2 in excess of Reach 2 and 3 losses must be apportioned between (23) and (28).

Note: The principle here is that riparian diversions can be made in an upstream reach, after losses in that reach, if natural flow at the head of that reach is not greater than the total losses in that and the next reach downstream. If natural flow at the head of a reach is greater than the total losses in both reaches but not enough to also meet total riparian demand in both reaches then the natural flow after losses must be apportioned.

Example, date 8th: after apportioning import natural flow losses in Reaches 1 and 2, there remains 4 cfs of import $[(12)-(15)-(21)]$ and 7 cfs of natural flow $[(8)-(16)-(22)]$ at the head of Reach 3; therefore 2 cfs of riparian diversion can be made in Reach 2 without adverse effect on Reach 3 riparians who would be unable to divert water anyway because of losses in Reach 3.

Example, date 9th: after allocating import and natural flow losses in Reaches 1 and 2 there remains 7 cfs of import water and 11 cfs of natural flow at the head of Reach 3. When this 18 cfs total is allocated to Reach 3 import (4 cfs) and natural flow (7 cfs), there remains 4 cfs of natural flow available for allocation to riparians in Reaches 2 and 3, or $\frac{(23)}{(23)+(28)}$ in Reach 2 and $\frac{(28)}{(23)+(28)}$ in Reach 3.

(25) Reach 3 total losses.

An input value of 11 cfs.

(26) Reach 3 import losses.

Proportional part of Reach 3 losses borne by import water remaining at the head of Reach 3.

$$(26) = \frac{(12)-(15)-(21)}{(12)-(15)-(21)+(8)-(16)-(22)} \times (25), \text{ or}$$

when Madera Canal deliveries (19) are being made

$$(26) = \frac{(12)-(15)-(21)+(19)}{(12)-(15)-(21)+(8)-(16)-(22)+(19)} \times (25)$$

(27) Reach 3 natural flow losses.

Proportional part of Reach 3 losses borne by natural flow available at head of Reach 3.

$$(27) = (25) - (26)$$

(28) Reach 3 riparian demand.

An input value which varies from month to month and is subject to future development.

(29) Reach 3 riparian diversions.

$$(29) = \text{Zero when } (8) \leq (16)+(17)+(22)+(27)$$

$$(29) = (27) \text{ when } (8) \geq (16)+(17)+(22)+(23)+(27)+(28)$$

See (24) above for apportioning procedure when $(8) > (16)+(17)+(22)+(27)$ but $\leq (16)+(17)+(22)+(23)+(27)+(28)$

D. To develop MID diversions at Franchi Dam.

(30) MID "200 cfs right" at Franchi Dam under PG and E-MID Soquel contract.

$$(30) = 200 \text{ cfs } -(11) \text{ Oct. 1-July 31}$$

$$(30) = 200 \text{ cfs } \text{ Aug. 1-Sept. 30}$$

(31) MID Soquel/Big Creek import diversion at Franchi under "200 cfs right."

(31) = $(12)-(15)-(21)-(26)$ with no Madera Canal deliveries (19).
With Madera Canal deliveries (19)

$$(31) = (12)-(15) - \left[(21)+(26) \right] \times \frac{(12)-(15)}{(12)-(15)+(19)}$$

(32) MID natural flow diversion at Franchi under "200 cfs right."

$$(32) = (8) - (16) - (22) - (24) - (27) - (29) \text{ but } \cancel{>} (30) - (31)$$

(33) MID Madera Canal delivery diversions.

$$(33) = (19) - [(21) + (26)] \times \frac{(19)}{(12) - (15) + (19)} > \text{zero.}$$

(34) Share of natural flow available at Franchi for allocation to MID's riparians capable of service via MC&I system.

Determined after (36) as:

$$(34) = \frac{(39)}{(39) + (40) + (41) + (42) + (50) + (51) + (52) + (53)} \times [(36) - (38) - (49)]$$

Provided, when $(36) \leq (37)$

$$(34) = > (37) \text{ and}$$

When $(36) < (37)$ but $\leq (37) + (49)$

$$(34) = \frac{(39)}{(39) + (40) + (41) + (42)} \times [(36) - (38)] = 0 \text{ normally because Sallaberry right (41) proportion is so large.}$$

Note: Under the 3/4 AF/A limit for Sallaberry (45) and Triangle-T (58) riparian demand, the above must be adjusted as shown under the 22d date and the "next" 16th date in the example table.

Under 22d date: (46) is limited to 83 cfs because of the 1,095 sfd limit on prior 30-day native pasture diversions.

$$(46) = \frac{(41)}{(39) + (40) + (41) + (42) + (52) + (53)} \times [(36) - (38) - (49)]$$

$$= \frac{500}{5 + 4 + 500 + 3 + 6 + 54} \times (173 - 25 - 4)$$

$$= 126, \text{ but limited to } 1,095 - 1,012 = 83 \text{ from (45)}$$

so

$$(34) = \frac{(39)}{(39) + (40) + (42) + (52) + (53)} \times [(36) - (38) - (45) - (49)]$$

$$= \frac{5}{5 + 4 + 3 + 6 + 54} \times (173 - 25 - 83 - 4) = 4$$

Under "next" 16th, the 4 cfs diversion of (46) on date 15th "falls off" the 30 days and can be added to maintain the 1,095 cfs limit. Also

on that "next" 16th date, the Triangle-T native pasture diversion (59) having reached the 503 cfs limit of (58) on the date 30th, the limit still holds and Triangle-T can make no native pasture diversion on "next" date 16th but can make only crop-land diversion (57).

Thus on "next" date 16th, (46) = 4 cfs and (59) = 0 cfs while (34), (44), (47) and (57) are equal, respectively, to (39), (40), (42) and (52).

(35) Total MID prior rights (non-appropriative under Application 15287) diversions at Franchi.
(35) = (31)+(32)+(33)+(34) but \nexists 318 cfs, the assumed maximum diversion capacity at Franchi

E. To develop losses, riparian demand, and riparian diversions in Reach 5 from Franchi Dam to Road 16 weir.

(36) Tentative natural flow available below Franchi Dam (used to apportion water among Reach 5 and 6 losses and riparian demands)
(36) = (8) - (16) - (22) - (24) - (27) - (29) - (32)

(37) Actual natural flow below Franchi Dam
(37) = (36) - (34)

(38) Reach 5 total losses
An input value of 25 cfs

(39) Reach 5 demand of riparians in MID serviceable via MC and I system canals.
An input value which varies from month to month and is subject to future development.

(40) Reach 5 riparian demand of Averill serviceable by diversions upstream of Road 16 weir and outside MID.
An input value which varies from month to month and which may be subject to future development.

(41) Reach 5 riparian demand of Sallaberry for wild flooding 2,896 acres of native pasture.
An input value of 500 cfs.

(42) Reach 5 other riparian demand serviceable by diversions upstream of Road 16 weir.

An input value currently reflecting Glantz' diversions. Varies from month to month and may be subject to future development.

(43) Reach 5 total riparian demand

$$(43) = (39)+(40)+(41)+(42)$$

(44) Reach 5 Averill riparian diversions

$$(44) = \frac{(40)}{(39)+(40)+(41)+(42)+(52)+(53)} \times \left[(36) - (38) - (49) \right]$$

See (34) above for other conditions.

(45) Aggregate Sallaberry diversions (46) in sfd during prior 30 days. Limited to 3/4 AF/A on 2,896 A, or 2,172 AF = 1,095 sfd.

An input value.

(46) Sallaberry proportional share of tentative natural flow (36) available below Franchi Dam.

$$(46) = \frac{(41)}{(39)+(40)+(41)+(42)+(52)+(53)} \times \left[(36) - (38) - (49) \right]$$

subject to the limit of (45)

(47) Reach 5 other riparians proportional share of tentative natural flow (36) below Franchi Dam.

$$(47) = \frac{(42)}{(39)+(40)+(41)+(42)+(52)+(53)} \times \left[(36) - (38) - (49) \right]$$

subject to procedure of (34) when Sallaberry (46) and Triangle-T native pasture (59) diversions are limited by (45) or (58).

(48) Total Reach 5 riparian diversions

$$(48) = (34)+(44)+(46)+(47)$$

F. To develop losses, riparian demand and riparian diversions in Reach 6 from Road 16 weir through Triangle-T ranch.

(49) Reach 6 total losses

An input value of 4 cfs

(50) - (51) Riparian demands between Road 16 and Triangle-T East line.

Input values currently zero but subject to future development.

(52) Triangle-T riparian crop demand.

An input value which varies from month to month and is subject to future development.

(53) Triangle-T riparian native pasture demand.

An input value limited to 60 cfs -(52) due to Road 9 diversion structure limited capacity. (That limit also may require reduction to 60 cfs -(50)-(51)-(52) if those riparian demands all develop.) Currently applicable to flooding of 1,329 A.

(54) Total Reach 6 riparian demand

$$(54) = (50) + (51) + (52) + (53)$$

(55) - (56) Riparian diversions between Road 16 and Triangle-T East line.

Currently zero due no development.

(57) Triangle-T riparian crop diversion

$$(57) = \frac{(52) + (53)}{(39) + (40) + (41) + (42) + (52) + (53)} \times \left[(36) - (38) - (49) \right]$$

but \nless (52)

(58) Aggregate Triangle-T diversions to native pasture (59) in sfd during prior 30 days. Limited to 3/4 AF/A on 1,329 A or 997 AF = 503 sfd.

(59) Triangle-T riparian diversions to native pasture

$$(59) = \frac{(52)+(53)}{(39)+(40)+(41)+(42)+(52)+(53)} \times [(36)-(38)-(49)]$$

but \nless 60 cfs -(57)

(60) Total Triangle-T riparian diversion

$$(60) = (57)+(59)$$

(limited to 60 cfs due Road 9 diversion structure capacity. May be further limited in future at times if riparian diversions occur between Road 9 and Triangle-T East line).

(61) Total Reach 6 riparian diversions

$$(61) = (55)+(56)+(60)$$

G. To develop diversions under Triangle-T (3/9/45), Sallaberry (1/13/50) and MID (4/10/53) appropriative rights.

(62) Triangle-T Application 11003 appropriative right.

An input value of zero since Road 9 structure limits flow to 60 cfs which all is assumed useable under riparian right.

(63) Sallaberry Application 13541 appropriative right.

An input value of 45 cfs for use on 480-acre service area outside riparian area.

(64) MID "second 200 cfs" Application 15287 appropriative right to divert at Franchi Dam.

An input value of 200 cfs limited by assumed 318 cfs total diversion capacity including (35).

(65) Blank

(66) Total appropriative rights

$$(66) = (62)+(63)+(64)$$

(67) Triangle-T diversion under Application 11003.

(67) = zero unless Road 9 diversion capacity is increased considerably.

(68) Aggregate Sallaberry diversions (69) under Application 13541 in sfd during prior 30 days. Limited to 3/4 AF/A on 480-acre service area outside riparian area = 360 AF = 182 sfd.

An input value.

(69) Sallaberry diversions under Application 13541.

$$(69) = (37) - (38) - (44) - (46) - (47) - (49) - (57) - (59) - (62)$$

but \neq 45 cfs and limited so (68) is \neq 182 sfd.

H. To total MID appropriations at Franchi Dam and to identify available water (spill) entering East Side By-pass unused under any right.

(70) MID diversions at Franchi under Application 15287.

$$(70) = \text{excess over (69)} \text{ limited so (70)+(35) is } \neq 318 \text{ cfs}$$

$$= (37) - (38) - (44) - (46) - (47) - (49) - (57) - (59) - (62) - (69)$$

(71) Total MID diversions at Franchi Dam

$$(71) = (35) + (70) \text{ but } \neq 318 \text{ cfs}$$

(72) Blank

(73) Spill to East Side By-pass, i.e., water not used under any upstream rights.

Table XI-2
Summary of monthly demands by Reach

		<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
Reach 1														
	AF cfs	0 0	0 0	0 0	0 0	0								
Reach 2														
	AF cfs	0 0	0 0	76 1	107 2	164 3	261 4	397 6	340 6	209 4	101 2	0 0	0 0	1655
Reach 3														
	AF cfs	4 0	19 0	481 8	676 11	964 16	1155 19	1280 21	1074 17	744 13	448 7	0 0	0 0	6845
Reach 5														
	MID AF cfs	7 0	33 0	169 3	269 5	453 7	630 11	764 12	639 10	341 6	139 2	0 0	0 0	3444
Averill														
	AF cfs	0 0	0 0	140 2	227 4	354 6	437 7	481 8	413 7	225 4	133 2	0 0	0 0	2410
Sallaberry														
	Max. AF cfs	2172 500	2172 500	2172 500	2172 500	--								
Other (Glantz)														
	AF cfs	0 0	0 0	115 2	163 3	265 4	442 7	641 10	578 9	393 7	187 3	0 0	0 0	2784
Reach 6														
	T Crop AF cfs	9 0	37 1	294 5	397 6	542 9	715 12	913 15	822 13	567 9	274 4	0 0	0 0	4470
T Pasture														
	Max. cfs	997 60	997 59	997 55	997 54	997 51	997 48	997 45	997 47	997 51	997 56	997 60	997 60	

Table XI-3
Reach losses

<u>Location</u>	<u>Reach</u>	<u>Loss</u>
Hidden Dam	1	11 cfs
Madera Canal	2	4
Head of Island	3	11
Franchi Dam	4	0
Franchi Dam	5	25
Road 16 weir	6	4
E.S.B.P/ T		
	Total loss	55 cfs

Taken from Don Roberts' memo of 7/5/79 to
R. L. Stanfield.

Dates	60 cfs Road 9 outlet capacity					100 cfs Road 9 outlet capacity				
	cfs	AF	Days affected			cfs	AF	Days affected		
			Tri-T	Salla-	berry			MID	Tri-T	Salla-
1969										
Feb. 1-12	0.65	15	12	0	0	0.65	15	12	0	0
Feb. 14-17	0.65	5	4	0	1	0.65	5	4	1	0
Feb. 21-28	0.65	5	4	0	0	0.65	10	8	0	0
Mar. 1-14	4.81	134	14	0	0	4.81	134	14	0	0
Mar. 17-19	4.81	29	3	0	0	4.81	29	3	0	0
Mar. 24-31	4.81	29	3	0	0	4.81	76	8	0	1
Apr. 1-13	6.72	173	13	0	2	6.72	173	13	0	2
Apr. 17-18	6.72	27	2	0	2	6.72	27	2	1	2
Apr. 26-30	6.72	27	2	0	1	6.72	67	5	0	1
May 1-3	8.88	53	3	0	0	8.88	53	3	0	0
May 4	4.09	8	1	0	0	4.09	8	1	0	0
May 8-13	8.88	106	6	0	0	8.88	106	6	0	0
1970										
Mar. 6-11	4.81	19	2	0	2	4.81	57	6	0	4
1971										
1972										
TOTALS		<hr/> 1,525	<hr/> 146	<hr/> 0	<hr/> 29		<hr/> 1,947	<hr/> 191	<hr/> 4	<hr/> 39

of introduce
Stereophones

XII. COMPUTER PROGRAMS

XII. Computer programs

Five computer runs were made with each following essentially the steps of Table XI-1 and its accompanying column explanation. The studies cover the following combinations of Sallaberry/Triangle T assumptions as to extent of riparian land and, in the case of Sallaberry, corresponding appropriative land under Application 13541:

1. (a) Sallaberry maximum riparian (2,896 A) and corresponding appropriative (480 A).
(b) Triangle T maximum riparian (2,783 A including 1,399 A native pasture, 1,281 A of other crops, and 103 A of non-irrigable channels).
(c) Road 9 outlet capacity 60 cfs.
2. (a) Sallaberry minimum riparian (1,830 A) and corresponding appropriative (1,301 A).
(b) Triangle T minimum riparian area (2,121 A, including 840 A native pasture, 1,183 A of other crops, and 98 A of non-irrigable channels).
(c) Road 9 outlet capacity 60 cfs.
3. 1(a) and 2(b) w/ 60 cfs Road 9 outlet capacity.
4. 1(b) and 2(a) w/ 60 cfs Road 9 outlet capacity.
5. 1(a) and 1(b) w/ 100 cfs Road 9 outlet capacity.

Each month of the 12-year study period occupies 3 pages in each study. The first page and the first 5 columns of page 2 (through "Natural Q Franchi Diversion") are the same each month of each of the 5 studies since the variations among the study involve only apportionment of flows below Franchi Dam.

At the end of each year are shown the daily diversions each month by reach and for Sallaberry's Application 13541, M.I.D.'s total at Franchi Dam, and unused system water (spill) below the last diversion.

As in Table XI-1, the columns are grouped to develop certain information:

Page 1. A. To develop Hidden natural inflow. Cols. 1-4 Big Creek and Soquel historical diversions each reduced by 4 cfs to reflect losses and one-day travel time allowed.

B. To develop Hidden future inflow. Cols. 5-7. Reflects elimination of Soquel import under M.I.D.-P.G. and E. contract and conforming Big Creek import to entitlement (historically, both imports exceeded entitlements at times).

C. Apportionment of flows to losses and riparians above Franchi Dam in Reaches 1, 2 and 3. Cols. 8-18, with Col. 10 "Madera Canal Import" inserted for possible use in future actual-operating studies.

Losses in each reach are proportioned between import and natural flow in each reach according to amounts of each at head of the reach.

Page 2. D. To develop M.I.D.'s diversions at Franchi Dam under its adjudicated right to all flow at Franchi Dam up to 200 cfs including imports. Cols. 1-5. M.I.D.'s diversion under this right is taken as the total Franchi flow but not to exceed all import (Col. 2) plus the M.I.D. right to natural flow after allowing for M.I.D.'s bypassing of Soquel water. For example, on February 13, 1962, M.I.D. bypassed 8.10 cfs (shown as "P.G. and E. Exchange" in Col. 9) and its adjudicated right is reduced to $200 - 8.10 = 191.9$ cfs; with 18.48 cfs of

Big Creek import being diverted, M.I.D. is entitled to $191.9 - 18.48 = 173.42$ cfs (Col. 5) of the 904.08 cfs (Col. 1) of natural flow at Franchi. M.I.D.'s diversion under its "200 cfs right as adjusted for Soquel bypass" is always Cols. 2 + 5.

E. To develop losses and riparian diversions in Reach 5. Cols. 6-16, except Cols. 7-9.

(a) Col. 10 is the flow remaining below Franchi Dam after total flow at Franchi (Col. 4) is reduced by M.I.D.'s diversions under its adjusted 200 cfs adjudicated right (Cols. 2 + 5).

(b) The first 25 cfs of Col. 10 flow meets Reach 5 losses.

(c) When Col. 10 is 26-29 cfs (see April 1, 1963), 25 cfs is lost in Reach 5 and the remainder is proportioned according to Table X-2 demands to M.I.D. Reach 5 riparians (Col. 6), other Reach 5 crop land (Col. 12), and Sallaberry native pasture (Col. 13) provided the accumulated total of the latter (Col. 14) does not exceed 3/4 AF per acre in any 30 successive days.

When 29 cfs or less passes Franchi, all would be lost in Reach 5 and 6 losses and none would be available for diversion in Reach 6 even if Reach 5 riparians diverted none. M.I.D. Reach 5 diversion apportionment is entered in Col. 6 and total diversion at Franchi Dam (Col. 8) = Col. 2 + 5 + 6.

Note that Col. 10 is total flow passing Franchi Dam before deducting Col. 6 and 7, i.e., Col. 10 = Col. 4 - Col. 2 - Col. 5.

Page 3. F. To develop Reach 6 riparian diversions, diversions under Sallaberry's Application 13541, M.I.D. diversions under Application 15287, and unused water or spill.

- (a) Outflow from Reach 5 (i.e., past the Road 16 weir) is in the last column on page 2.
- (b) When 30 cfs or more passes Franchi Dam (Col. 10), 25 cfs is allocated to Reach 5 losses (Col. 11 on page 2) and 4 cfs is allocated to Reach 6 losses (Col. 1).
- (c) Flow passing Franchi in excess of Reach 5 and 6 losses is proportioned according to Table X-2 demands to Reach 5 and 6 riparians (Cols. 6, 12 and 13 as limited by Col. 14 on page 2, and Cols. 2, 3 and 4 with Col. 4 limited to the Col. 5 accumulated diversion to Triangle T pasture of 3/4 AF per acre in any period of 30 successive days).

- G. To develop flows available for appropriative rights.
 - (a) When flows passing Franchi Dam are more than enough to meet Reach 5 and 6 losses (Col. 11 on page 2 and Col. 1 on page 3) and total Reach 5 and 6 riparian demand (Cols. 6, 12 and 13 as limited by 14 on page 2 and Cols. 2, 3 and 4 as limited by Col. 5 on page 3), water is available for satisfaction, in order, of Sallaberry's Application 13541 and M.I.D.'s Application 15287.
 - (b) Flows available for the appropriators after all riparians is in Col. 8 on page 3.
 - (c) Sallaberry's Application 13541 diversion is in Col. 9 as limited by the Col. 10 accumulated diversion in the prior 30 days of 3/4 AF per acre.
 - (d) M.I.D.'s Application 15287 diversion is in Col. 11. (But see H. below).

- H. To develop M.I.D.'s total diversion at Franchi Dam and water spilled past Triangle T ranch, i.e., not required for any right.

(a) M.I.D.'s total diversion at Franchi (Col. 8, page 2) is the sum of Cols. 2, 5, 6 and 7 on page 2 with that Col. 7 being the same as Col. 11 on page 3. Col. 8 on page 2 is limited to 318 cfs, the presently-estimated maximum diversion rate at Franchi Dam.

(b) The last Col. 12 on page 3 is system spill or flow passing Triangle T ranch and exceeding all rights.

It is noted that Triangle T's Application 11003 right is prior to both Sallaberry's and M.I.D.'s appropriative right but is not reflected in the computer studies. See Section XIII.

XIII. TRIANGLE T APPROPRIATION UNDER APPLICATION 11003

XIII. Triangle T appropriation under Application 11003

The computer studies do not reflect directly the yield of the Triangle T appropriative right. That yield, and the effects of satisfying it on the yields of Sallaberry's (A-13541) and M.I.D.'s (A-15287) appropriative rights and on spill or unused water of the system can be learned from analysis of the studies.

Water is available under A-11003 only when flows at Franchi Dam exceed downstream losses of 29 cfs and requirements of riparians.

From the diversion season (February 1-July 15 of each year), the location of the diversion point and existing facilities, and the known riparian overlap, it appears the intent is to use the appropriated water for irrigation of crop land in Secs. 14 (63 A), 16 (83 A), 20 (319.5 A), 21 (380 A), 22 (49.0 A), 28 (200 A) and 29 (131 A) for a maximum of 1,225.5 A. At 80 AF/A the 17.5 cfs diversion right appears a little large which probably reinforces the belief that the 1,225.5 A is a maximum.

Water requirement

It is assumed the 1,225.5 A excludes roads, ditches and verges. There are 1,281 A of crop land in the Triangle T riparian area including a 5% allowance for roads, ditches and verges. Distribution of cotton, hay and barley on the riparian and appropriative area appear comparable. Accordingly, the monthly demand on the appropriative land is proportioned from that on the riparian land as follows (1,225/0.95 x 1,281):

February	37 AF	0.66 cfs
March	296	4.81
April	400	6.72
May	546	8.88
June	720	12.10
July	919	14.95 (to 15th)

There is no crop-land requirement on Triangle T in November and December and only barley has such a requirement in January and February. Barley on riparian land requires 9 AF (0.15 cfs) in January and 37 AF (0.66 cfs) in February. If it is considered that crop-land has priority over native pasture and maximum diversion capacity is 60 cfs, and if water is available, the 60 cfs can be diverted to riparian pasture land in November and December; in January, 0.15 cfs and 59.85 cfs can be delivered to riparian crop and pasture land, respectively, while in February 0.66 cfs and 59.34 cfs can be so diverted.

No water can be delivered to the appropriative land when there is a demand for the full 60 cfs on riparian land. Water being available, the only time the appropriative land can be serviced at all is during a 30-day period when the 3/4 AF/A limit on riparian pasture land is in effect. At such time, riparian crop land demand is always far less than 60 cfs and there is capacity available in the Road 9 outlet for delivery of water to the appropriative land.

Thus the following prevails:

(1) When riparian demand is not limited by the 3/4 AF/A limit, no water can be delivered to the appropriative land.

(2) When water cannot be delivered to the riparian pasture land because the 3/4 AF/A limit is in effect, water up to the above crop demand can be delivered to the appropriative land and the supply available to Sallaberry (A-13541) and Madera (A-15287) may be diminished accordingly.

If it be assumed that the silts clogging the channel below the outlet are removed, thus restoring the design outlet capacity to 100 cfs, the above is still valid if 100 cfs is substituted for 60 cfs. The effect in this case is to reduce the time required to reach the 3/4 AF per A limit in each period of water availability thereby increasing the number of days in each such period when water can be diverted to the appropriative land.

Availability of useful water under A-11003

Table XIII-1 shows the dates during the 12-year study period when water is available with Road 9 outlet capacities of 60 and 100 cfs. The table also indicates the number of days in each such occurrence when diversion would reduce Sallaberry's and M.I.D.'s diversions under their junior appropriative rights.

The table is constructed from data in Study No. 1 (maximum Sallaberry/maximum Triangle T/60 cfs) and No. 5 (maximum Sallaberry/maximum Triangle T/100 cfs). Data used are on page 3 of the studies for each month. Cols. 6, 8, 9 and 11 are used. Having in mind that all calculations leading to Col. 8 (outflow below Triangle T) reflect all upstream diversions under riparian rights, the only times water can be available for Triangle T's senior appropriative right is when water is available concurrently with Road 9 outlet capacity excess to Triangle T's riparian needs.

The concurrency exists when (1) there is outflow shown in Col. 8 and Triangle T's total diversion (Col. 6) is less than the outlet capacity of 60 or 100 cfs.

For example, using February, 1962, for illustration, there is no water available for Reach 5 and 6 diversions February 1-8, incl. (as shown in Col. 10, p. 2). February 9-13, incl., there is ample water to meet Reach 5 and 6 riparian demands (as limited by Road 9 outlet capacity) and to meet part or all of Sallaberry's and M.I.D.'s junior appropriative demands. (On the 9th, only 10.06 cfs of M.I.D.'s can be met with the available water). On February 28, water passing Franchi Dam (from Col. 10, p. 2) is again inadequate for Reach 5 losses so there is none for Reach 5 and 6 riparians. From February 14-27, incl., Triangle T's riparian pasture land demand was not limited on 11 days (60 cfs outlet) or 14 days (100 cfs outlet) and capacity was available to meet Triangle T's appropriative demand. With Sallaberry appropriative diversions being limited by the 3/4 AF per acre pasture

limit on and after February 13, Triangle T appropriations during the February 14-27 period would not affect Sallaberry. M.I.D.'s total diversion (page 2, Col. 8 of the study) was limited to the 318 cfs diversion capacity through February 22 (317.99 cfs on the 22d), so Triangle T's appropriative diversion could adversely impact M.I.D. only on February 23-27, incl.

Table XIII-1 shows that exercise of Triangle T's appropriative right under A-11003 would adversely affect Sallaberry's A-13541 and M.I.D.'s A-15287 appropriations as follows:

With Road 9 outlet capacity 60 cfs:

Sallaberry - none

M.I.D. - on 29 days

With Road 9 outlet capacity 100 cfs:

Sallaberry - on 4 days

M.I.D. - on 39 days

Table XIII-1 also shows:

(a) With Road 9 outlet capacity at 60 cfs:

- (1) Over the 12 years, Triangle T could divert a total of 1,525 AF on 146 days.
- (2) Over the 12 years, diversions would average 127 AF/year.
- (3) Omitting 1967 and 1969, the other 10 years average 23 AF/year.

(b) With Road 9 outlet capacity at 100 cfs:

- (1) 12-year diversions on 191 days total 1,947 AF.
- (2) Over the 12 years, diversions average 162 AF/year.
- (3) Omitting 1967 and 1969, the other 10 years average 38 AF/year.

The Triangle T appropriative right yields 80-85% of the 1961-72 supply in the two years, 1967 and 1969, when the entire system is over-supplied. Half to two-thirds the days when M.I.D. and Sallaberry are affected also occur in those two years.

Table XIII-1

Water availability and effects of taking under Application 11003

Dates	60 cfs Road 9 outlet capacity						100 cfs Road 9 outlet capacity					
	cfs	AF	Days affected			cfs	AF	Days affected			cfs	AF
			Tri-T	Salla-	berry			Tri-T	Salla-	berry		
1961	--	--	--	--	--	--	--	--	--	--	--	--
1962												
Feb. 14-27	0.65	14	11	0	5	0.65	18	14	0	5		
Mar. 3	4.81	10	1	0	1	4.81	10	1	0	1		
Mar. 6-10	4.81	48	5	0	0	4.81	48	5	0	0		
1963												
Feb. 11	--	--	--	0	0	0.65	1	1	1	1		
Feb. 13-15	0.65	1	1	0	1	0.65	4	3	0	2		
Apr. 21-26	6.72	27	2	0	1	6.72	80	6	0	4		
1964	--	--	--	--	--	--	--	--	--	--		
1965												
Apr. 13-24	6.72	107	8	0	5	6.72	160	12	0	5		
Apr. 25	0.89	2	1	0	1	0.89	2	1	0	1		
1966	--	--	--	--	--	--	--	--	--	--		
1967												
Feb. 3-5	--	--	--	0	0	0.65	4	3	1	2		
Mar. 17-26	4.81	57	6	0	6	4.81	95	10	0	7		
Mar. 29-30	4.81	19	2	0	1	4.81	19	2	0	1		
Apr. 1-11	6.72	147	11	0	0	6.72	147	11	0	0		
Apr. 17-30	6.72	133	10	0	0	6.72	187	14	0	0		
May 1-11	8.88	194	11	0	0	8.88	194	11	0	0		
May 20-31	8.88	123	7	0	0	8.88	194	11	0	0		
June 1	6.74	13	1	0	0	12.10	24	1	0	0		
1968	--	--	--	--	--	--	--	--	--	--		